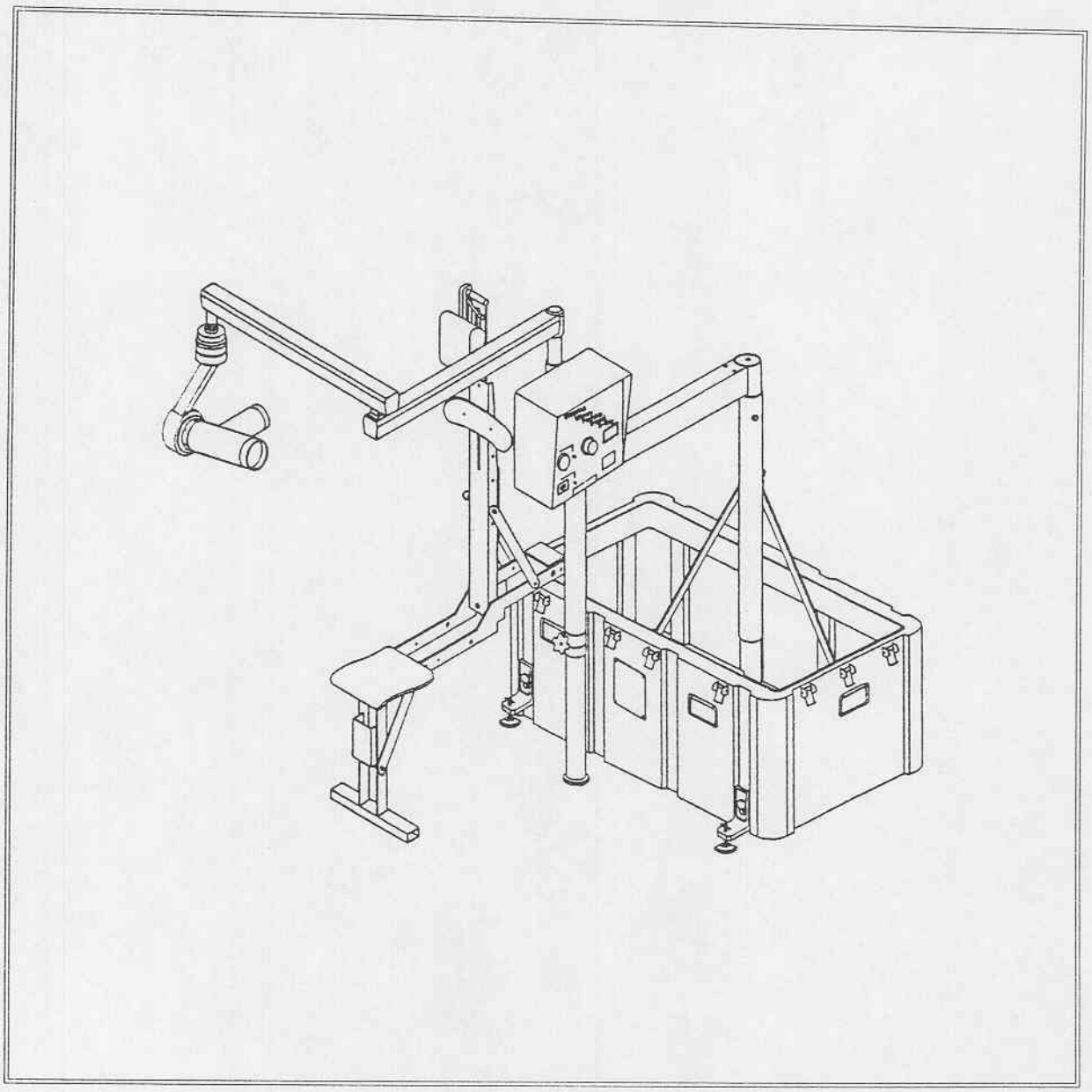
OPERATION MANUAL

for the

ALPHA MPDX

PORTABLE DENTAL X-RAY SYSTEM

N.S.N. 6525-01-370-7552



DYNARAD Corp.
19 Jefryn Blvd. West
Deer Park, NY 11729

RECORD OF CHANGES

CHANGE NO.	DATE	TITLE OR BRIEF DESCRIPTION	ENTERED BY

HOW TO USE THIS MANUAL

The manual is intended to provide an easily usable source of reference that will assist in the understanding the basics of assembly, operation and maintenance of the ALPHA MPDX Portable Dental X-Ray System. The manual is arranged in three sections, each of which will support a particular function of the X-Ray System. A complete table of contents, list of illustrations, list of tables and an index are included to assist in the location of information contained in the manual.

PARAGRAPH, PAGE, FIGURE, AND TABLE NUMBERING SYSTEM

All paragraphs, pages, figures, and tables are assigned numbers keyed to the section and sequence in which they appear. For example, Figure 2-1 is the first figure in Section 2, and Figure 2-2 is the second figure in Section 2.

CONTENTS

The information presented in each section of this manual is as follows:

Section I - General Description. This section introduces the content of the manual; describes the X-Ray System, its purpose, function, and capabilities; and provides a table of leading particulars. Each major assembly of the X-Ray System is illustrated.

Section II - Assembly and Preparation for Use. This section provides the instructions necessary to unpack and assemble the ALPHA MPDX.

Section III - Operation. This section contains the ALPHA MPDX Portable Dental X-Ray System Operating Instructions.

The ALPHA MPDX Portable Dental X-Ray System, manufactured by Dynarad Corp., 19 Jefryn Blvd. West, Deer Park, NY 11729 USA, provides high quality dental X-ray capability in a portable format. It is intended for dental applications where a compact, rugged, and highly mobile dental X-ray system is required. The system complies with the requirements of the United States Department of Health and Human Services for mobile and special purpose radiographic equipment, when operated, maintained and repaired in accordance with the instructions in this manual.

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SAFETY SUMMARY

Certain safety precautions are unique to the ALPHA MPDX Portable Dental X-Ray System, and must be observed at all times by all personnel.

The following are general safety precautions not related to any specific procedures and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe all safety regulations.

Do not replace components or make adjustments inside the equipment with any high voltage power supply turned on. Under certain conditions, dangerous potentials may exist when the power control is in the OFF position, due to charges retained by capacitors. To avoid injury, always remove power and discharge and ground a circuit before touching it.

DO NOT SERVICE OR ADJUST ALONE

Under no circumstances should any person reach into or enter the enclosure for the purpose of servicing or adjusting the equipment except in the presence of someone who is capable of rendering aid.

RESUSCITATION

Personnel working with, or near, high voltages should be familiar with modern methods of resuscitation. Such information may be obtained from the Bureau of Medicine and Surgery.

FOR YOUR INFORMATION

The following keys are included throughout this manual to bring your attention to certain procedures and precautions. Each of these keys is intended for the following purposes:

NOTE: To highlight an instruction or procedure that requires special attention.

CAUTION: To bring your attention to an instruction or procedure which, if improperly performed, could damage the equipment.

WARNING: To bring your attention to an instruction or procedure which, if improperly performed, could cause bodily injury to the operator, maintainer and/or patient.

The following cautions and warnings should be observed.

CAUTION

The X-Ray System is not designed to withstand an air drop.

WARNING

The X-Ray System in its Carrying Case is very heavy (190 lbs). To avoid personal injury, exercise care when lifting. Two (2) men are required to lift the Carrying Case or the Carrying Case Cover.

WARNING

Personnel working with or near X-radiation should be fully acquainted with the recommendations of the National Committee on Radiation Protection as published in the National Bureau of Standards Handbooks and the International Commission of Radiation Protection, and should take adequate precautions to protect against injury. X-ray equipment, if not properly used, can cause injury. The X-Ray System incorporates a high degree of protection against X-radiation, however, there is no way to provide complete protection. The X-Ray System operators and maintainers must take normal precautionary steps to avoid unwisely or unknowingly exposing themselves or others to direct or secondary radiation. It is mandatory that all persons authorized to use the equipment are aware of the danger of excessive exposure to X-radiation and that these persons be properly trained and instructed. Various protective devices and materials are available. It is urged that such devices and materials be used.

WARNING

To avoid injury to inexperienced personnel, only trained and qualified personnel should be permitted access to the internal portions of the X-Ray System.

WARNING

Adjustments of resistors must be performed with all power to the X-Ray System turned off. Failure to turn off power could result in bodily injury to servicing personnel.

WARNING

Dangerous voltages are present inside the X-Ray Control Assembly (1A1). Failure to turn off power could result in bodily injury to servicing personnel.

SECTION 1

GENERAL DESCRIPTION

1-1 INTRODUCTION

This manual provides operating instructions for the ALPHA MPDX Portable Dental X-Ray System, hereinafter referred to as the X-Ray System (Figure 1-1). The X-Ray System is manufactured by Dynarad Inc., Deer Park, NY 11729.

This manual consists of three sections as follows:

Section I	General Description
Section II	Assembly and Preparation for Use
Section III	Operation

1-2 CAPABILITIES AND LIMITATIONS

The ALPHA MPDX Portable Dental X-Ray System (hereinafter referred to as the X-Ray System) is designed for use as a portable, intra-oral radiology system.

1-2.1 System Capabilities

The X-Ray System is designed to operate with an electrical power input of 110 to 240VAC, at 50 to 60 Hz. The X-Ray System delivers a tube current of seven milliamps DC, at a constant potential of 70 kilovolts (kV). The duty cycle is one second of operation in 60 seconds. Exposure times are from 0.012 through 2.0 seconds, in 22 steps.

1-2.2 System Limitations

The X-Ray System is certified in accordance with, Department of Health and Human Services Regulation, Title 21, Subchapter J, Code of Federal Regulations for Radiation Generating Equipment. The X-Ray System meets the requirements of Underwriter's Laboratories, Inc. Standard UL 187 (X-Ray Equipment- Dielectric Voltage Withstand), as well as the ANSI/AAMI Standard for Safe Current Limits for Electromedical Apparatus.

1-3 PURPOSE AND FUNCTION

The X-Ray System is a lightweight, portable, intra-oral, dental X-ray system, intended for use in small medical units, field hospitals, and for general-purpose dental examinations.

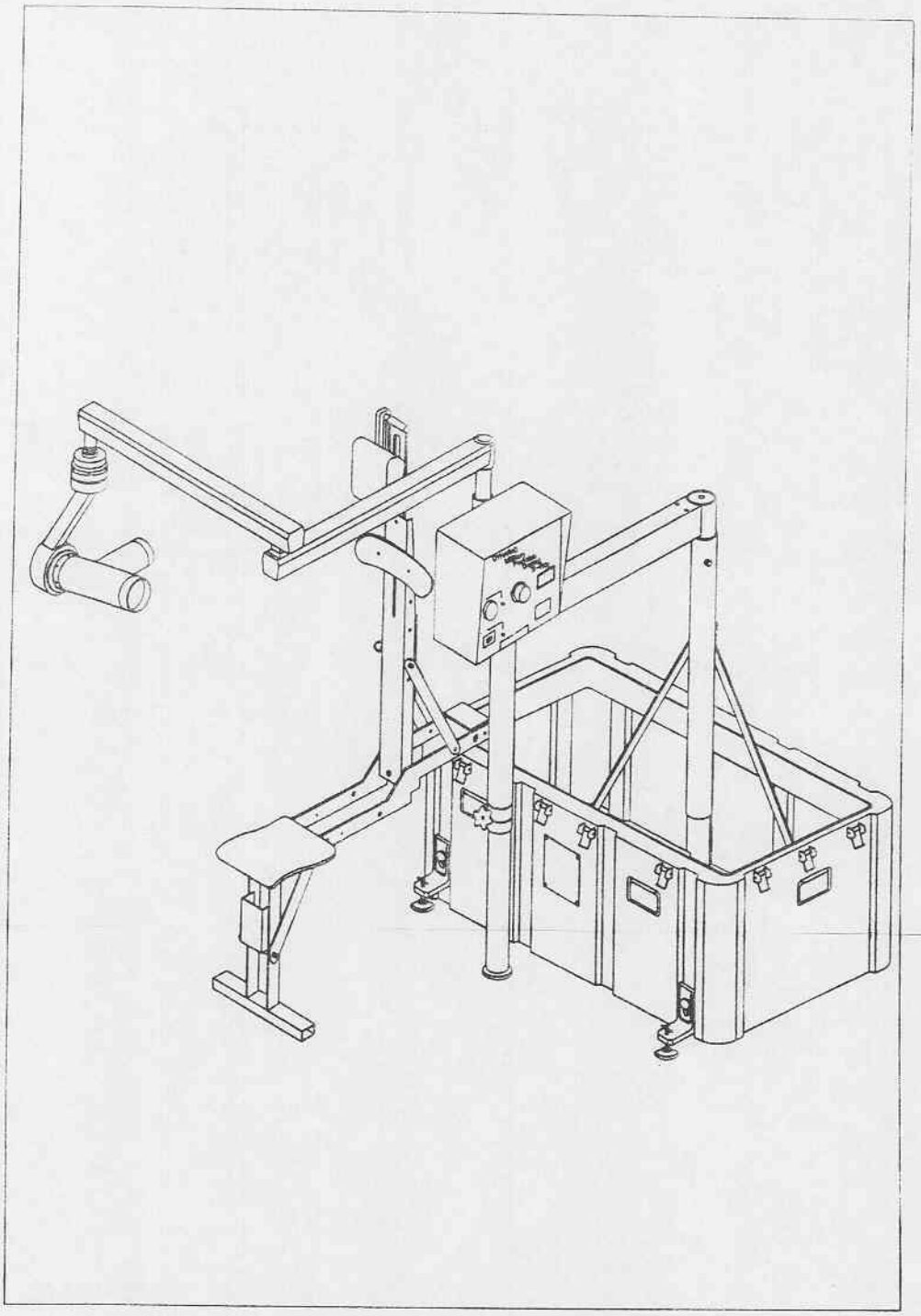

Figure 1-1. ALPHA MPDX Portable Dental X-Ray System

Table 1-1 lists the leading particulars of the X-Ray System. Table 1-2 is a list of items supplied.

Table 1-1. System Leading Particulars

PERFORMANCE SPECIFICATIONS	
kVp:	70 kVp nominal; plus/minus 10% constant potential. kVp measurements performed with Keithley kVp Divider, Model No. 35080 and Hitachi Model VC-6020, Storage Oscilloscope, or equivalent.
mA:	7 mA DC plus/minus 10%. Milliampere (mA) current measurements are taken using a Hitachi Storage Oscilloscope Model VC-6020, or equivalent.
Exposure time:	Selected by means of a 22-position rotary switch (12ms to 2.00 seconds in 22 steps, +/-10%, plus +/-4ms). Measurements performed with Keithley Model No. 35050 Dosimeter and Hitachi Model VC-6020, Storage Oscilloscope, or equivalent, at the 50% level.
POWER	
Line voltage:	110 VAC, to 240VAC, 50/60 Hz.
Line voltage regulation:	5% max. load
Technique factor for maximum line current:	70 kV,7mA
Maximum line current:	7 amps - @ 120 VAC line power 3.5 amps - @ 220 VAC line power
BEAM ANGLE	12° maximum
FOCAL SPOT SIZE	.5 mm square (NEMA)
TARGET MATERIAL	Tungsten
POWER SUPPLY TYPE	High frequency constant potential
MINIMUM PERMANENT FILTRATION	1.5 mm aluminum, or equivalent at 70 kV.

Table 1-1. System Leading Particulars - Continued

LEAKAGE TECHNIQUE FACTORS	Leakage test performed @ 70 kVp and 0.7 mA output power, one (1) second per side. (mR x 60 = mR/hour.)
WEIGHT	In Carrying Case - 190 pounds
SHIPPING CRATE DIMENSIONS	46 in.(long) X 28.5 in. (wide) X 30 in. (high), Volume 22.76 ft^3
COOLING CURVES AND DUTY CYCLE	In order to allow proper tube cooling between exposures, the system contains an automatic inhibit circuit that provides a time delay of 15 seconds between exposures. (See Figures 1-2 through 1-5 for X-Ray Tube Radiographic Rating, Filament Characteristics and Cooling Curves.)
X-RAY TUBE TECHNICAL SPECIFICATIONS	
Envelope:	Hard glass throughout
Focus:	0.5mm (NEMA)
Target Angle:	12 degrees
Maximum Anode Cooling Rate:	20,000 Heat Units/minute
Anode Heat Storage Capacity:	20,000 Heat Units (14,000 Joules)
Maximum Useful Voltage:	95 kVp
Filament Characteristics	
Voltage Range:	3.0 to 4.0 volts
Current Range:	1.9 to 2.2 amps

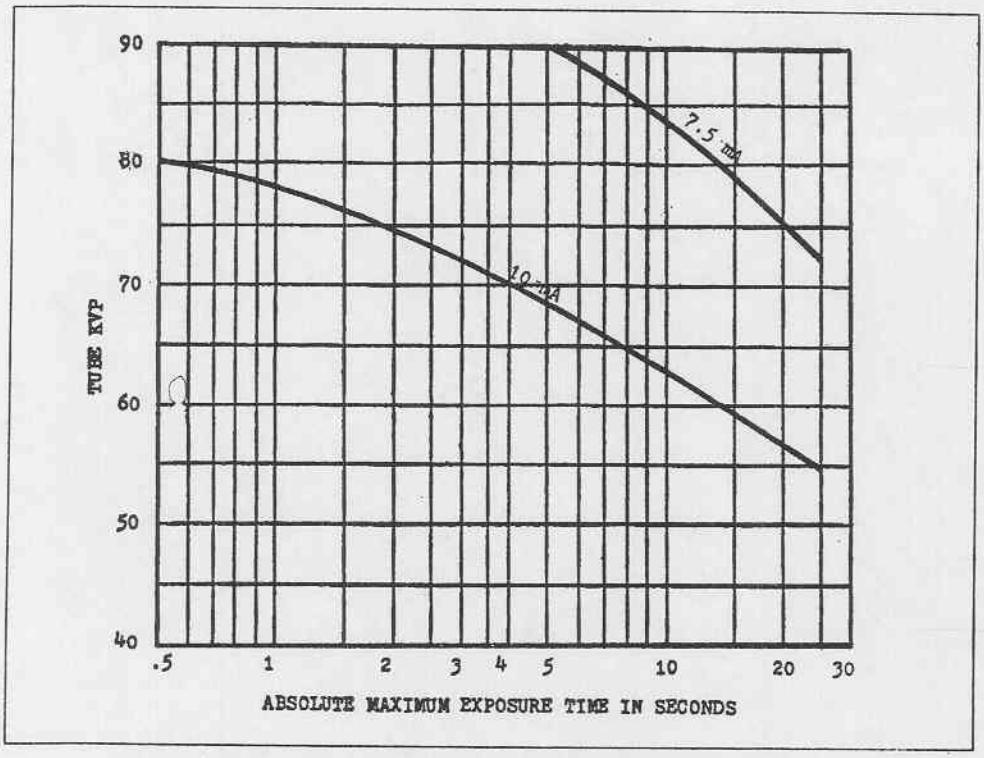

Figure 1-2. X-Ray Tube Radiographic Rating

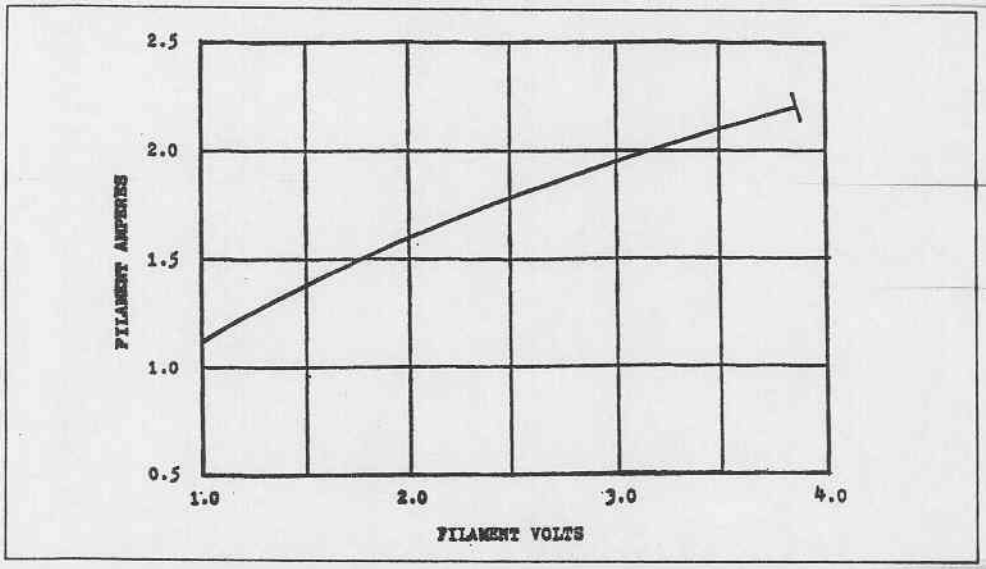

Figure 1-3. X-Ray Tube Filament Characteristics

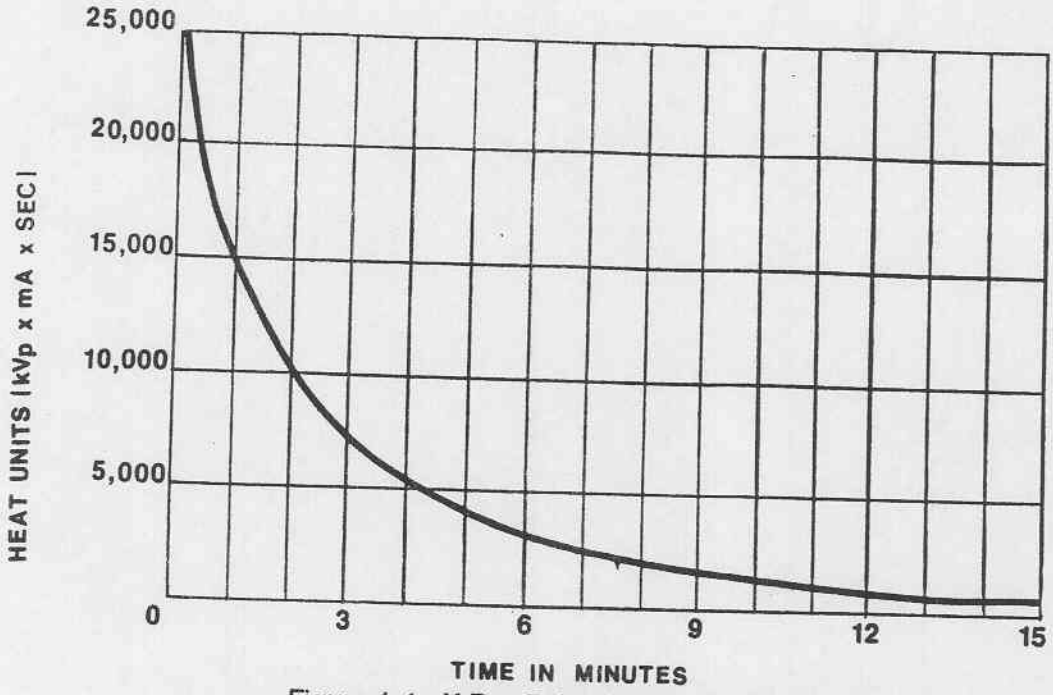

Figure 1-4. X-Ray Tube Anode, Cooling Curve

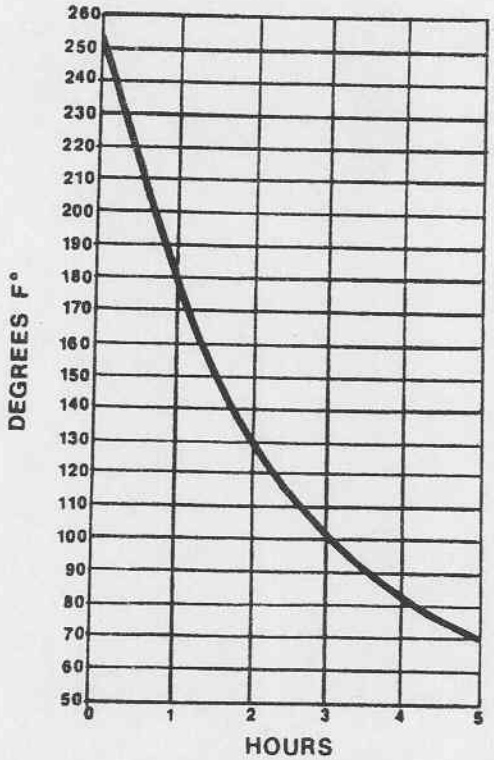

Figure 1-5. X-Ray Tube Head Assembly, Cooling Curve.

Table 1-2. List of Items Supplied

Item	Qty	Part No.
X-Ray Unit (Unit 1)	1	500876
Chair Unit (Unit 2)	1	500892
Carrying Case Unit (Unit 3)	1	500883
Operation Manual	2	500893/OM
Maintenance Manual	2	500893/MM

NOTE

A complete inventory of parts shipped in the Carrying Case and the Carrying Case Cover is provided in paragraph 2-4 in Section 2 of this manual.

1-4 DESCRIPTION

A physical description and illustration of each of the system's major units is provided in the following paragraphs and figures.

The system is shipped in a Carrying Case (Unit 3). Whenever the system is transported to another site, it will be repacked in the Carrying Case . The system is designed for rapid assembly or disassembly prior to, or after, transport.

1-4.1 X-Ray Unit (Unit 1)

The X-Ray Unit (Unit 1) contains: the X-Ray Control Assembly (1A1), the X-Ray Source Assembly (1A2) and the Scissor Arm Assembly (1A3), each of which is described in the following subparagraphs.

1-4.1.1 X-Ray Control Assembly (1A1)

Major components of the X-Ray Control Assembly (see Figure 1-1) are:

- Control Board Subassembly (1A1A1)
- Timer Switch Board Subassembly (1A1A2)
- Anode Supply Subassembly (1A1A3)
- Cathode Supply Subassembly (1A1A4)
- Capacitor Board Subassembly (1A1A5)
- Panel Subassembly (1A1A6)
- Exposure Switch Subassembly (1A1A7)
- Line Filter Subassembly (1A1LF1)
- X-Ray Control, Harness Subassembly (1A1A9)
- Line Cord (1A1W1)

1-4.1.2 X-Ray Source Assembly (1A2)

The X-Ray Source Assembly (1A2) (see Figure 1-1) contains the following major components:

- X-Ray Head Subassembly (1A2A1)
- Dental Cone (1A2A2)

1-4.1.2.1 X-Ray Head Subassembly (1A2A1). The X-Ray Head Subassembly (1A2A1) contains: the X-ray tube, the case and the high- voltage cables, sealed in an epoxy-filled, non-repairable subassembly.

1-4.1.2.2 Dental Cone Subassembly (1A2A2). The Dental Cone Assembly is attached to the X-Ray Head Subassembly via a threaded fitting.

1-4.1.3 Scissor Arm Assembly (1A3).

The Scissor Arm Assembly (1A3) is part of X-Ray Unit 1. The Scissor Arm Assembly supports the X-Ray Source Assembly (1A2) and permits positioning of the X-ray head in all necessary diagnostic positions.

1-4.2 Chair Unit (Unit 2)

The Chair Unit (Unit 2) major components include: the seat, backrest, headrest and corresponding mechanical supporting assemblies. The Chair Unit is collapsible for packing in the Carrying Case. The headrest is secured to the back of the seat assembly.

1-4.2.1 Headrest Assembly (2A1)

The headrest can be horizontally and vertically adjusted and then locked in place.

1-4.3 Carrying Case Unit (Unit 3)

The spun-molded, polyethylene Carrying Case Unit (Unit 3) (see Figure 1-1) is used to store and transport the X-Ray System and to provide the structural framework required to support the X-Ray Unit (Unit 1) and the Chair Unit (Unit 2) during operation. The contents of the Carrying Case includes: a set of four leveling brackets/leveling pads, which are attached to the Carrying Case during assembly/setup, a steel frame, mounting posts for the Extension Tube and for the Chair Unit, as well as shipping/retaining straps. The case also includes provision for housing a dental processor. Refer to paragraph 2-4 in Section 2 of this manual for a complete inventory of the carrying case contents.

SECTION 2

ASSEMBLY AND PREPARATION FOR USE

2-1 INTRODUCTION

This section contains, facility requirements for installation, unpacking and inspection procedures, assembly/setup procedure, the procedure for inspection after assembly and required adjustments after assembly of the X-ray system units.

2-2 FACILITY REQUIREMENTS FOR INSTALLATION

The X-ray system facility requirements are: a stable mounting site, accessibility to electrical power, and proximity to support equipment (i.e., X-ray film processing).

2-2.1 Power Requirements.

Power requirements for the ALPHA MPDX Portable Dental X-Ray System are as follows:

Line voltage range:	110 VAC to 240 VAC , at 50/60 Hz. Operation automatically controlled.
Line voltage regulation:	±5% max load
Technique factor for maximum line current:	70 kV - 7 mA DC
Maximum line current:	7 amps - 120 VAC line 3.5 amps - 220 VAC line

2-3 UNPACKING AND PRE-ASSEMBLY INSPECTION

Upon receipt of the X-Ray System, carefully examine the shipping container exterior for any evidence of mishandling during shipment. If any damage is observed, notify your supervisor immediately.

2-4 ASSEMBLY/SETUP PROCEDURE

The X-Ray System is designed to be assembled without the need for any tools, additional materials, or test equipment. Figures 2-1 through 2-5 illustrate the assembly procedure.

The cover and lower section of the Case Unit each house key components of the X-Ray System. Prior to assembling the X-Ray System, An inventory of major parts should be taken. Check the parts removed against the following list and identify each part in Figure 2-1.

Parts Shipped In Cover

- o Chair Unit
- o Truss Arm
- o Telescopic Leg

Parts Shipped In Case Lower Section

- o X-Ray Unit - comprising the following components:
  - -X-Ray Source Assembly
  - -Scissor Arm Assembly
  - -Control Assembly
- o Two (2) identical steel Support Braces
- o Extension Tube
- o Four (4) Leveling Foot Assemblies
- o Dental Cone
- o Line Cord
- o Exposure Switch
- o Two (2) Operation Manuals
- o Two (2) Maintenance Manuals

Assemble the X-Ray System in the following sequence:

WARNING

The Case Unit Cover is heavy and should be removed by two (2) men to avoid the possibility of dropping the Cover and consequently causing injury to personnel and damage to the equipment.

1. Open the Carrying Case, Unit 3. Unpack the contents of the carrying case cover and lower section, by removing or releasing the thumbscrews, brackets and straps that secure the X-ray system components during shipping. Initially unfasten the Velcro Straps holding X-Ray Unit (X-Ray Source Assembly, Scissor Arm Assembly and Control Assembly) to the inside front of the lower section of the case unit and remove the X-Ray Unit. Release the latch holding the Scissor Arm Assembly in the folded position. Unfasten the Velcro Straps securing the Extension Tube to the back of the lower section of the Case Unit and remove the Extension Tube. Remove the Exposure Switch which is stored in a buttoned pouch, attached to the short end of the lower section. There are no special instructions required to remove the remaining components from the base of the lower section of the case unit.

Loosen the thumbscrews that secure the truss arm shipping brackets in the inside of the Case Unit Cover. Open the shipping brackets and remove the Truss Arm. Remove the wing nut securing the Chair Unit to the shipping bolt. (To avoid losing the wing nut, temporally fasten it to the shipping bolt.) Unfasten the built-in strap on the inside of the Case Unit Cover and lift out the Chair Unit. Lift the Telescopic Leg straight out of the snap-in retainers mounted in the Case Unit Cover.

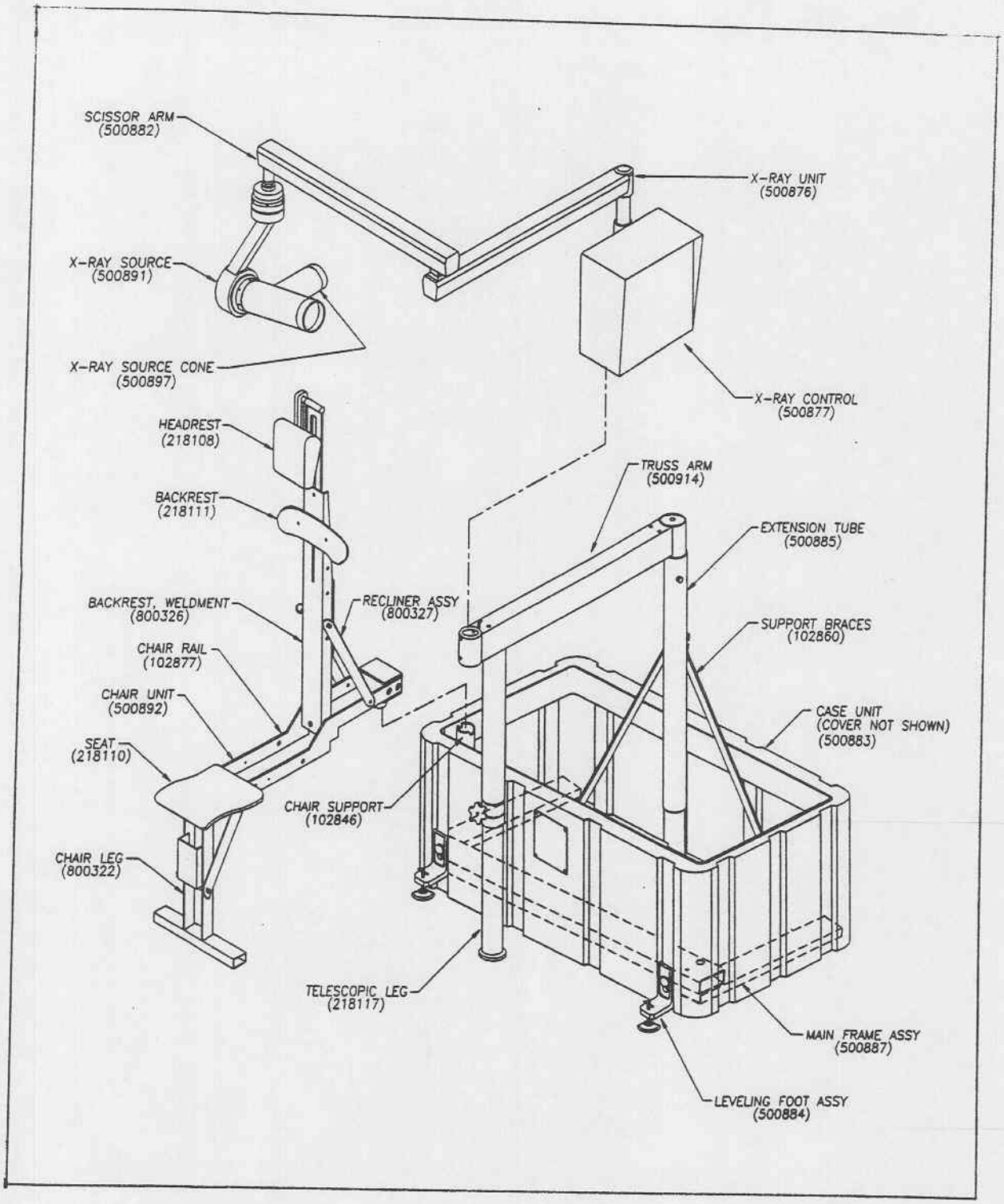

Figure 2-1. ALPHA MPDX Portable Dental X-Ray System, Assembly Diagram

2-4 ASSEMBLY/SETUP PROCEDURE (Continued)

2. Install each of the four (4) Leveling Foot Assemblies, two each on each long side of the case. Note that each leveling foot bracket includes a key-hole cutout, see Figure 2-2(A) which fits over the associated mounting hub built into the lower edge of the case. After positioning the key hole over mounting hub, lift up on the leveling foot to snap it into place.
Perform initial adjustment of the thumbscrew on each leveling foot to complete preliminary leveling of the case. (Turning the thumbscrew in a clockwise direction extends the leveling pad, turning the thumbscrew counter-clockwise, retracts the leveling pad.)

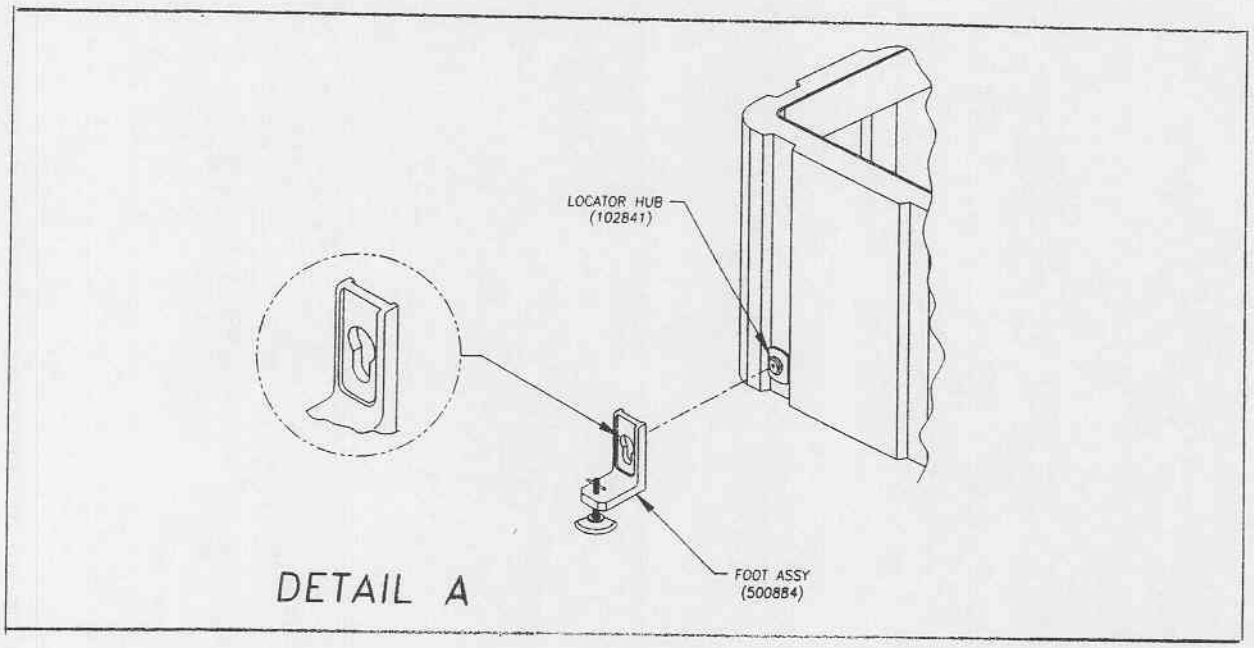

Figure 2-2. Assembly Detail A

3. Insert the Extension Tube into the mount built into the Main Frame Assembly. Ensure that the orientation of the Extension Tube is exactly as shown in Figure 2-3(B). The positioning of the Extension Tube is critical to proper installation of the Support Braces and secure tightening of thumbscrews.

4. The two (2) identical, steel Support Braces must be loosely mounted on the Main Frame Assembly, located in the base of the lower section of the case, and to the Extension Tube (See Figure 2-3(B). Loosen the two (2) thumbscrews on the Main Frame Assembly and the two (2) on the Extension Tube, before proceeding with this installation.

NOTE

Both Support Braces are manufactured with different angles at each end to provide maximum support for the Extension Tube and to ensure that each Support Brace is properly mated at each end to the respective shaft and thumbscrew in each of the Main Frame Assembly and Extension Tube. The end of each support tube that mates with the extension tube is marked with a decal arrow, that points toward the extension tube.

If the mounting slot in the end of the Support Brace cannot be aligned with the shaft and thumbscrew in either the Main Frame Assembly or the Extension Tube, turn the Support Brace around and try aligning the other end. After each Support Brace has been properly mated with its shaft and thumbscrew, hand tighten each thumbscrew to secure each Support Brace.

5. Install Truss Arm on Extension Tube, as shown in Figure 2-3(B). Ensure that the Truss Arm is properly seated.

6. Insert the Telescopic Leg into the fitting on the underside of the Truss Arm. Ensure that the Telescopic Leg is properly seated, see Figure 2-3(B). Loosen wing nut on lower part of telescopic leg and extend leg to the floor.

NOTE

A bubble-type, bull's eye Level is built into the top of the Extension Tube to assist the installer in leveling the unit.

7. Using the Level in the top of the Extension Tube, adjust the Telescopic Leg, Extension Tube, Support Braces (2) and Leveling Feet (4) as required to center the bubble within the circle on the Level.

8. When the unit is level, securely tighten the four (4) thumbscrews on the Support Braces and also tighten the wing nut on the Telescopic Leg.

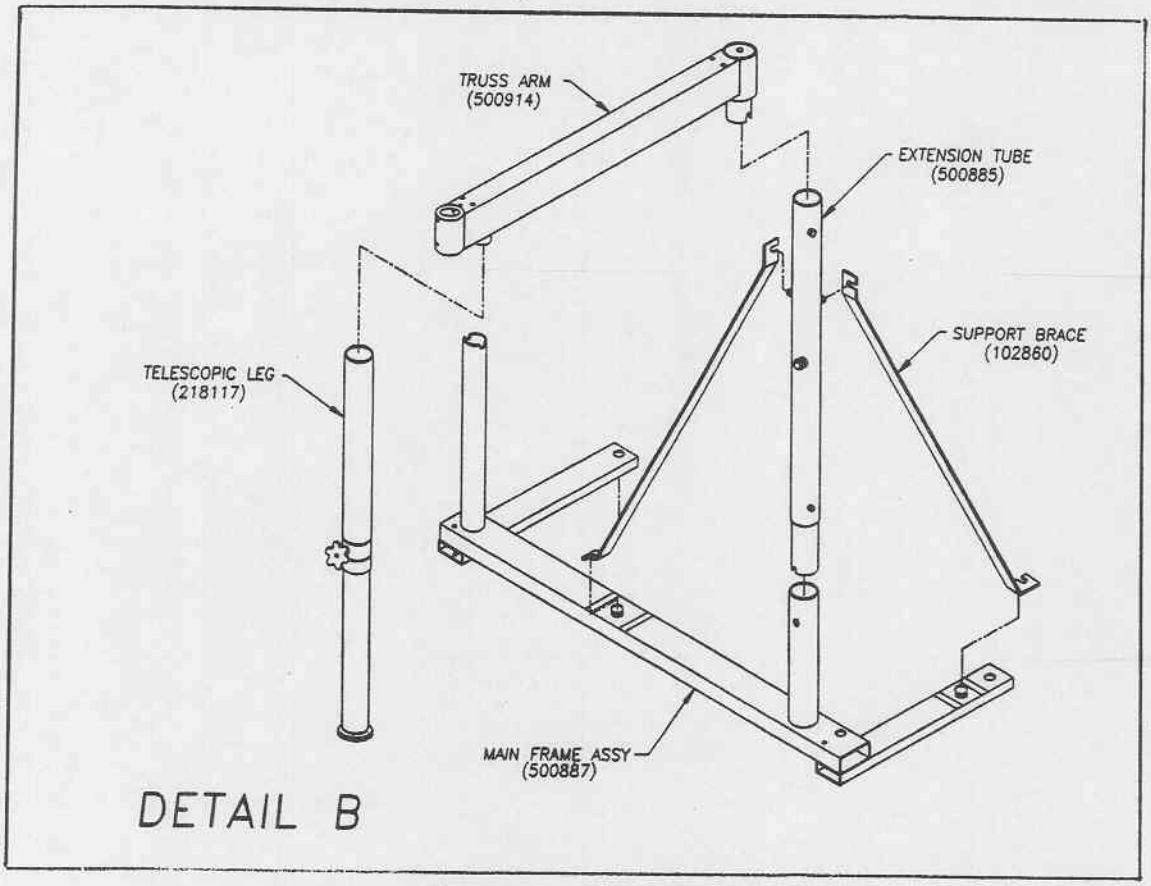

Figure 2-3. Assembly Detail B

2-4 ASSEMBLY/SETUP PROCEDURE (Continued)

9. Ensure that the latch holding the Scissor Arm Assembly in the folded shipping position has been released during unpacking. Install the Control Assembly of the X-Ray Unit on the Truss Arm by inserting the male fitting on the Control Assembly into the receptacle on the Truss Arm. Ensure that the notch in the Control Assembly Mounting Tube is engaged with the Dowel Pin, located adjacent to the receptacle, in the Truss Arm, see Figure 2-4(C).

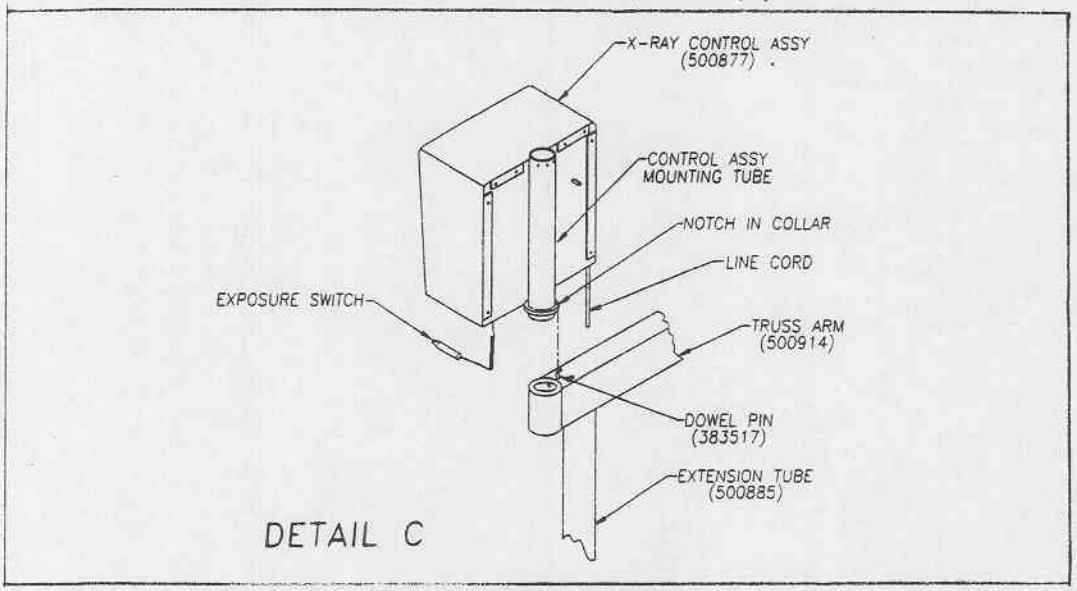

Figure 2-4. Assembly Detail C

10. Install the Chair Unit by inserting the male fitting at the bottom/rear of the chair rail, into the Chair Support mounted on the Case Main Frame Assembly, see Figure 2-5(D) . Ensure that the pin built into the male fitting is properly seated in the notches in the chair support fitting.

11. Remove the Chair Unit Quick-Release Locking Pin located on the Chair Rail (see Figures 2-1 and 2-5(D) and lift the Backrest Weldment to an upright position.

NOTE

Three (3) holes are provided for insertion of the Locking Pin in the Backrest Weldment. To adjust the Backrest Weldment for any one of three (3) recliner angles, align the hole in the Recliner Assembly with the hole in the Backrest Weldment that represents the selected angle of recline. Reinsert the Quick Release Locking Pin through the Recliner Assembly and into the selected hole in the Backrest Weldment.

12. Remove the Quick Release Locking Pin located underneath the Chair Unit (see Figure 2-5(D). Swing Chair Leg down until the leg is squarely set on the floor. Align the holes in the Limit Arm with the holes in the Chair Leg and reinstall the Locking Pin.

13. Loosen the Star Knob behind the Headrest on the Backrest Weldment. Adjust the Headrest to the desired position, up or down, and retighten the Star Knob.

2-4 ASSEMBLY/SETUP PROCEDURE (Continued)

14. To initially adjust the position of the Headrest, closer to, or further away from the patient position, set the Headrest Locking Lever ,see Figure 2-5(D), to the unlocked (up) position. Adjust the Headrest to the position of your choice and lock the Headrest in that position by moving the Headrest Locking Lever to the locked (down) position.

NOTE

The position of the Headrest should be adjusted for the comfort of each patient.

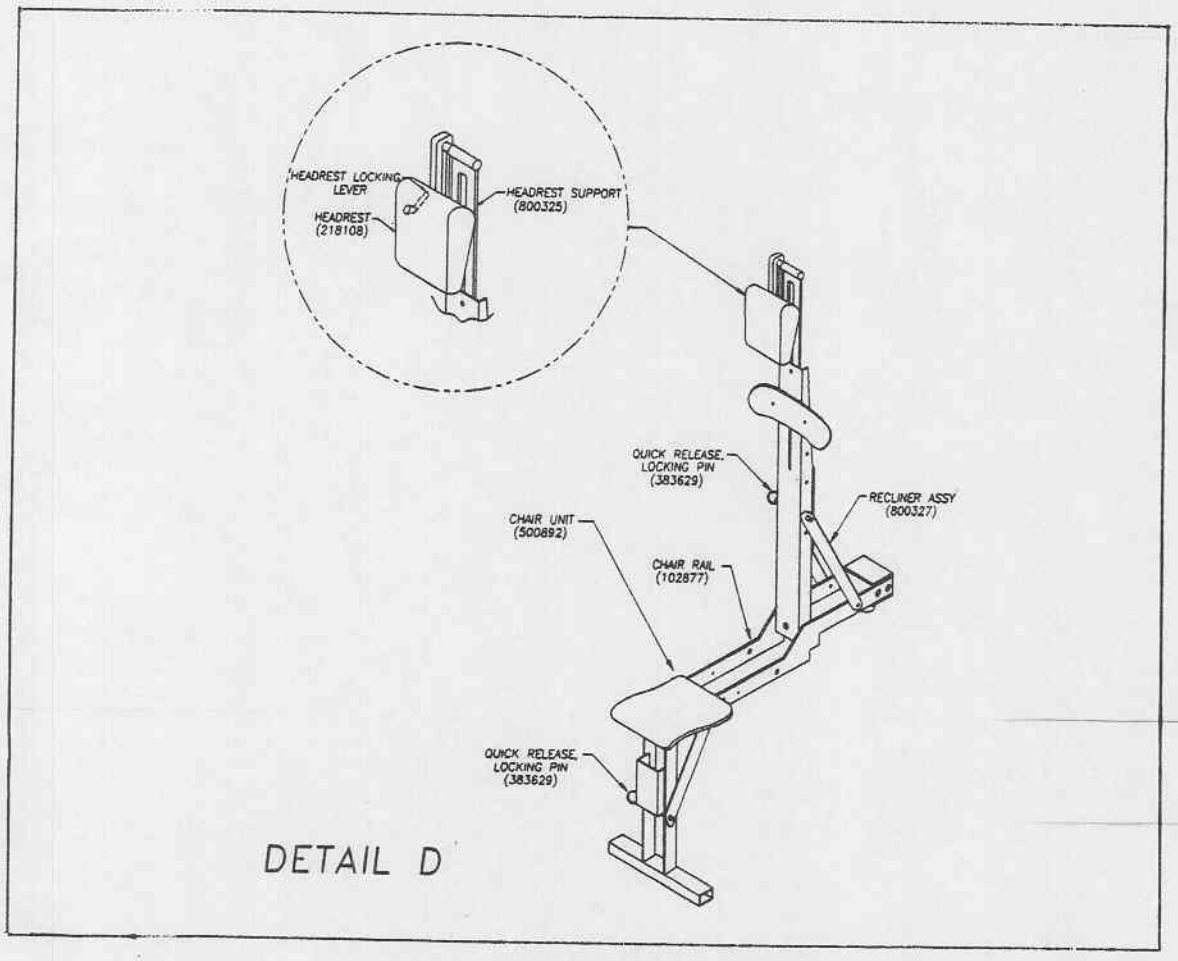

Figure 2-5. Assembly Detail D

15. Install the X-Ray Dental Cone (which is shipped in the foam cutout in the base of Case Unit). The Dental Cone should be mounted on the threaded male receptacle on the X-Ray Source Assembly (see Figure 2-1). Engage the threads on the male receptacle and turn the Cone in a clockwise direction until it is hand tight.

16. Install the Exposure Switch in the X-Ray Control by plugging the jack end into the jack receptacle on the underside of the X-Ray Control, next to the power receptacle. (See Figure 2-4(C).

CAUTION

To prevent possible damage from power surges, always plug the Power Cord into the X-Ray System before plugging into the power source.

17. Insert the Power Cord into the power receptacle, next to the exposure switch jack, on the underside of the Control Assembly, see Figure 2-4(C).

2-5 INSPECTION AFTER ASSEMBLY

The following inspection procedures must be performed after the X-Ray System is assembled and prior to placing the X-Ray System into operation.

1. Ensure that all Quick Release Pins are fully inserted and locked in place.
2. Ensure that all locking knobs are hand-tight (full clockwise position).
3. Verify the security of the Cone installed on the X-Ray Control Assembly.
4. Check security of all electrical connectors.
5. Verify that all labels are securely affixed and legible.
6. Thoroughly inspect the assembled X-Ray System for: tight fittings, possible missing parts (including the Operation and Maintenance Manuals), frayed electrical cords, cracks, chips, excessive wear or other signs of deterioration.
7. Using a lint-free cloth, remove any noticeable dirt or excess dust from the assembled unit.
8. Check X-Ray Head Subassembly 1A2A1 in all working positions for possible drift.
9. Check Scissor Arm Assembly 1A3 in all working positions for ease of motion.

WARNING

To avoid potential injury to both patient and operator, the user is **NOT** permitted to use this X-Ray System if any damage that could affect radiation safety is observed, until such damage is repaired and the potential radiation hazard is eliminated.

10. Refer to paragraph 3-3, in Section 3 of this manual, for the Preoperational Checkout Procedure.

2-6 DISASSEMBLY/REPACKING PROCEDURE

Disassembly of the X-Ray System for repacking and possible reshipment is essentially the reverse of the assembly procedure provided in paragraph 2-4, with some specific instruction in regard to sensitive components. This procedure provides general instructions for disassembly where general procedures are adequate and detailed instructions as required to safely disassemble the X-Ray System while avoiding any possibility of damage to one or more of the components. (See Figures 2-1 through 2-5.)

1. Unplug and remove the Power Cord. Store the Power Cord in the case lower section.

2. Unplug and remove the Exposure Switch. Store the Exposure Switch in the buttoned pouch in the lower section of the Case Unit.

3. Remove the Dental Cone from the X-Ray Source Assembly. Carefully store the Dental Cone in the foam cutout in the base of the Case Unit.

4. Loosen the Star Knob that holds the Headrest in place. Slide the Headrest to the desired stored position on the Backrest Weldment and retighten the Star Knob.

5. Remove the Quick Release Locking Pin located underneath the Chair Unit. Swing the Chair Leg up to the stored position. Align the holes on the Chair Leg with the holes on the Limit Arm and insert the Quick Release Locking Pin.

6. Remove the Quick Release Locking Pin that is positioned through the Recliner Assembly into the Backrest Weldment. Fold the Backrest Weldment down to the stored position. Insert the Quick Release Locking Pin through Chair Rail into the Backrest Weldment.

7. With the Chair Unit and Backrest Weldment folded and locked in the stored position, lift the Chair Unit free of the Case Main Frame Assembly Chair Support. Set the Chair Unit into shipping position in the Case Unit Cover, align shipping bolt in Cover with mating hole in the Chair Unit. Fasten the chair unit shipping strap (built into the Cover) over the Chair Unit and tighten it securely. After the Chair Unit is set in place, fasten the wing nut over the shipping bolt and turn wing nut until hand tight.

8. Disconnect the Control Assembly from the Truss Arm. Lock the Scissor Arm Assembly in the folded position by securing the built-in latch, around the control assembly mounting tube, above the collar. Store the complete X-Ray Unit in the lower section of the Case Unit.

9. Loosen the wing nut on the Telescopic Leg, collapse the Telescopic Leg and retighten the wing nut with the leg in the collapsed position. Remove the Telescopic Leg from the fitting on the underside of the Truss Arm. Store the Telescopic Leg in the snap-in retainers in the Case Unit Cover.

10. Disconnect the Truss Arm from the Extension Tube. Store the Truss Arm in the two shipping brackets in the Case Unit Cover. Secure Truss Arm by tightening the thumbscrews built into the brackets.

11. Loosen the thumbscrews holding the Support Braces to the Extension Tube and to the Main Frame Assembly. Remove the Support Braces and store them in the lower section of the Case Unit.

2-6 DISASSEMBLY/REPACKING PROCEDURES (Continued)

12. Pull the Extension Tube free of the mount built into the Main Frame Assembly. Store Extension Tube in lower section of Case Unit and secure in place with Velcro Straps.

13. Loosen the thumbscrew on each Leveling Foot Assembly. Push down on each Leveling Foot Assembly until the key-hole cutout is aligned with the hub and slide the each Leveling Foot Assembly away from the associated hub. Store the Leveling Foot Assemblies in the foam cutout in the lower section of the Case Unit.

14. Install all packing material in both sections of the Case Unit and check all brackets and straps used to secure the X-Ray System.

CAUTION

The Case Unit Cover is heavy and should be lifted by two (2) men to avoid the possibility of dropping the Cover and consequently causing injury to personnel and damage to the equipment.

15. Lift the Case Unit Cover on top of the lower section of the case unit. Ensure that the rubber gasket in the Cover is in direct contact with raised lip which runs around the circumference of the top of the lower section. Engage and lock all Case Unit Latches.
The X-Ray System is now ready for storage or shipment.

SECTION 3

OPERATION

3-1 INTRODUCTION

This section contains the operating instructions for the X-Ray System. Paragraph 3-2 describes the functions of the X-ray system controls and indicators. Paragraph 3-3 describes the preoperational checkout procedures and paragraph 3-4 provides the X-ray system operating procedures.

3-2 FUNCTIONS OF CONTROLS AND INDICATORS

The X-ray system operating controls and indicators are contained in the X-Ray Control Assembly (1A1) in Unit 1. The X-ray control assembly controls and indicators are located and identified in Figure 3-1. Table 3-1 provides the function of each operating control and indicator.

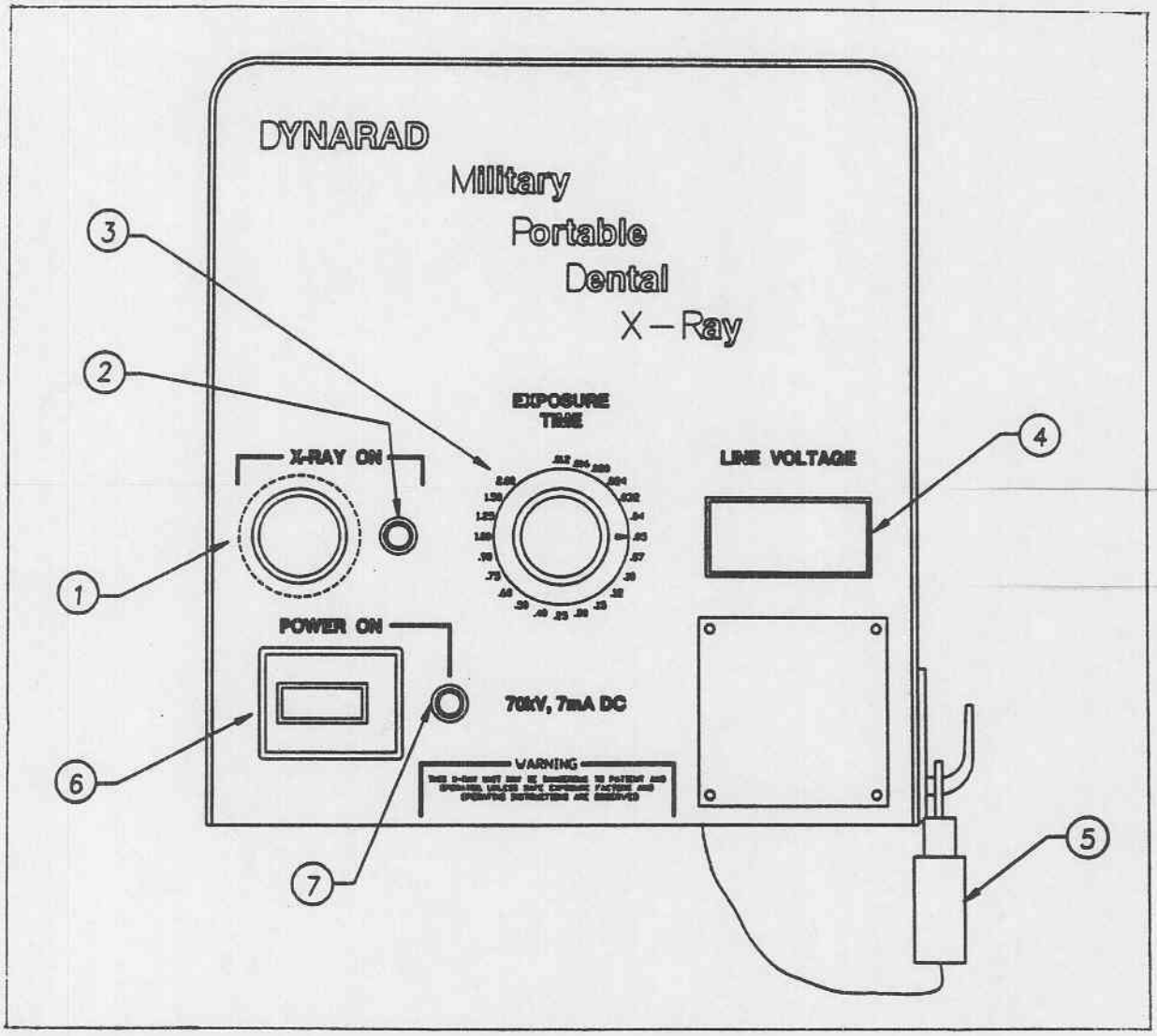

Figure 3-1. X-Ray Control Assembly (1A1), Location of Operating Controls and Indicators

Table 3-1. X-Ray Control Assembly (1A1), Functions of Controls and Indicators

Figure 3-1 Index No.	Control/ Indicator	Function
1	Buzzer	Emits an audible tone when X-Rays are being generated. The buzzer sounds simultaneously with the X-Ray generation, except for very short exposures, the tone duration is extended to 1 second, to make it easier for the operator to hear.
2	X-RAY Indicator	A solid-state, light-emitting diode (LED) illuminates when X-Rays are being generated. This occurs during the same time interval as the buzzer.
3	TIMER Switch	A rotary switch that provides for selection of exposure time from .012 to 2.0 seconds.
4	Line Voltage Display	Indicates the line voltage in use.
5	Exposure Switch	A momentary-action, hand-operated switch that controls operation of the X-ray beam. This is a "dead man" type switch and must be pressed continuously during the exposure. Releasing the switch will terminate the exposure and reset the timer.
6	POWER ON Switch/ Circuit Breaker	A switch/circuit breaker that controls primary power to X-Ray Unit 1. Operating the switch turns the unit on. Power should not be turned on until the X-Ray System is ready to use and should be turned off after use.
7	POWER ON Indicator	A red neon lamp that illuminates when the power is on.

3-3 PRE-OPERATIONAL CHECKOUT

This paragraph provides the X-ray system pre-operational checkout procedures, which must be performed prior to daily operation, or first time operation, of the X-Ray System.

NOTE

Prior to performing the Pre-Operational Checkout Procedure, verify that the X-Ray System Inspection Procedure, provided in paragraph 2-5 in Section 2 of this manual, has been successfully completed.

a. Check the line power plug connection to the line power receptacle.

b. Check security of the electrical connection between X-Ray Control Assembly 1A1 and X-Ray Unit 1.

c. Cover the cone port with lead shielding.

d. Position the tubehead away from the X-ray unit mounting post (Scissor Arm Assembly fully extended).

e. Set the rotary TIMER Switch to 0.1 second.

f. While holding Exposure Switch, **STEP BACK FROM THE UNIT APPROXIMATELY SIX (6) FEET.**

g. Depress and hold down the Exposure Switch. The X-Ray Indicator light will illuminate and the Buzzer will emit an audible tone. The Exposure Switch will automatically switch off when the time set on the TIMER Switch expires.

h. In the event that either or both of the X-Ray Indicator light or Buzzer fail to function as described in Step g., refer to the Troubleshooting Procedure provided in Section 5 of this manual.

WARNING

To avoid possible injury to patient and operator, **DO NOT** operate the X-Ray System unless all Pre-Operational Checks have been successfully completed.

3-4 OPERATING PROCEDURES

WARNING

Personnel working with or near X-Radiation should be fully acquainted with the recommendations of the National Committee on Radiation Protection as published in the National Bureau of Standards Handbooks and the International Commission of Radiation Protection, and should take adequate precautions to protect against injury. X-Ray equipment, if not properly used, can cause injury. Dynarad's Alpha MPDX Dental X-Ray System incorporates a high degree of protection against X-radiation, however, there is no way to provide complete protection unless the X-Ray System operators take normal precautionary steps to prevent unwisely or unknowingly exposing themselves or others to direct or secondary radiation. It is mandatory that all persons authorized to use the equipment are aware of the danger of excessive exposure to X-radiation and are properly trained and instructed in its use. Protective devices and materials should be available to operators and maintainers of this system. It is urged that such devices and materials be used by the system operators and maintainers.

NOTE

Prior to proceeding with System Operating Instructions, verify that Inspection Procedures and Pre-Operational Checks have been successfully completed.

3-4.1 System Operating instructions.

The step-by-step X-ray system operating procedure should be performed as follows:

1. Set the POWER On/Off,Circuit Breaker/Switch to the On position. The red neon Power On indicator lamp on the X-Ray Unit will illuminate and the Line Voltage Display will indicate the actual line voltage being used by the X-Ray System.

2. In accordance with the X-Ray Exposure Time Selections for Your Site, Table 3-3, set the TIMER switch for the exposure time selected for the x-ray procedure being performed.

3. Seat the patient. Position the x-ray head cone close to, but not touching, the target area of the patient's jaw.

WARNING

Use of a lead apron is recommended to fully protect the patient from X-radiation.

NOTE

The Exposure Switch is a momentary action switch that controls operation of the X-ray beam. The switch **must be depressed continuously** during the exposure; releasing the switch will terminate the exposure and will reset the TIMER.

4. **STEP BACK FROM THE UNIT APPROXIMATELY SIX (6) FEET** and depress the Exposure Switch. Hold the switch in the depressed position until the exposure is complete.

3-4.1.1 Recommended Exposure Times. The enclosed General Recommended Time Selections presented in Table 3-2 may be used as a guide to develop your own radiographic technique. If the exposure time suggested does not produce the density desired, use the space provided in Table 3-3 (Time Selections For Your Site) to write in your preferred time value.

NOTES

Ensure that the film processing solutions are fresh, and that proper processing methods are used. If these precautions are not observed, test films may give misleading indications of optimum exposure time.

Alternate exposure settings should be used to compensate for patients of abnormal size and for edentulous areas. Use approximately one-half the exposure time recommended below for edentulous areas.

To avoid the possibility of film results that are too light, the end of the Dental Cone should be positioned as close to the patient's face as possible.

Table 3-2. General Recommended Time Selections

Examination	Film Speed Group D (Such as Kodak Ultra Speed)	Film SpeedGroup E (Such as Kodak Ektaspeed)
Periapical Anteriors or Bitewing Anteriors	.25	.15
Periapical Posteriors or Bitewing Posteriors	.40	.20

Table 3-3. Time Selections For Your Site

Examination	Film Speed Group D (Such as Kodak Ultra Speed)	Film Speed Group E (Such as Kodak Ektaspeed)
Periapical Anteriors or Bitewing Anteriors		
Periapical Posteriors or Bitewing Posteriors		

3-5 DENTAL X-RAY TECHNIQUES

The following paragraphs provide instructions required to perform the dental techniques to be employed specifically for the Dental X-Ray System. The periapical film techniques and the horizontal angulation procedures are described in paragraphs 3.5.1 and 3.5.2.

3-5.1 Periapical Film Techniques.

The following procedures describe the dental Periapical Film X-Ray Techniques.

a. Patient Seating

1) Technician efficiency

2) Patient comfort

3) Applicance removal

4) Patient history

b. Patient Position

1) Occlusal plane parallel to floor

(A) Maxillary arch (tragus of ear to ala of nose)

(B) Mandibular arch (tragus of ear to corner of mouth)

c. Periapical Exposures

1) Maxillary arch - seven exposures

2) Mandibular arch - seven exposures

3-5.1 Periapical Film Techniques. -Continued.

d. Film Placement

1) Pebbled surface toward unit

2) Dot toward incisal edge or occlusal surface

3) Long axis of film

(A) Posterior exposures (horizontal)

(B) Anterior exposures (vertical)

4) Margin (border) on film

(A) Posterior - 1/4"

(B) Anterior - 1/8"

5) Retaining film position

(A) Patient always holds film

(B) Right or left hand

(1) Thumb (maxillary arch)

(2) Index finger (mandibular arch)

e. Central Ray Angulation

1) Vertical Angulation

(A) Up and down movement of X-ray tube head

(1) Positive (maxillary) - tube head points downward

(2) Negative (mandibular) - tube head points upward

(B) Rule of vertical angulation

(C) Excessive vertical angulation (foreshortening)

(D) Insufficient vertical angulation (elongation)

3-5.2 Horizontal Angulation.

This paragraph describes application of the Horizontal Angulation dental x-ray technique, as follows:

a. Side-to-side movement of tube head

b. Rule of horizontal angulation

c. Incorrect horizontal angulation (overlapping)

Central Ray Direction

a. Center of film

b. Tube or cone almost, but not quite, touching patient

c. Incorrect central ray direction (cone-cutting)

3-6 ROUTINE CARE, MAINTENANCE AND CLEANING PROCEDURES

The Dental X-Ray System requires no special operator care or maintenance procedures, other than an occasional cleaning. To clean the exterior surfaces of the ALPHA MPDX Portable Dental X-Ray System, use a clean cloth that has been moistened, not soaked, in a solution made from clean, fresh water and mild soap.

CAUTIONS

To avoid damage to electrical and electronic components, do not soak any components of the X-Ray System during cleaning.
To avoid damaging lettering, and dulling the finish on exterior surfaces, do not use strong cleaners or solvents.
To avoid scratches on the lens of the LINE VOLTAGE indicator, do not attempt to polish the lens cover.

3-7 STORAGE

CAUTION

Refer to Alpha MPDX Maintenance Manual paragraph 5-4, Long Term Storage Procedures for storage durations of longer than six (6) months.

The Dental X-Ray System does not require any special storage facilities. The non-operating (storage) temperature limits are -30°F to +120°F and the humidity limits are 0 to 95% (non-condensing). The system may be stored indoors or outdoors (within the temperature and humidity limits). However, the system should be sealed in the re-usable container during outdoor storage.

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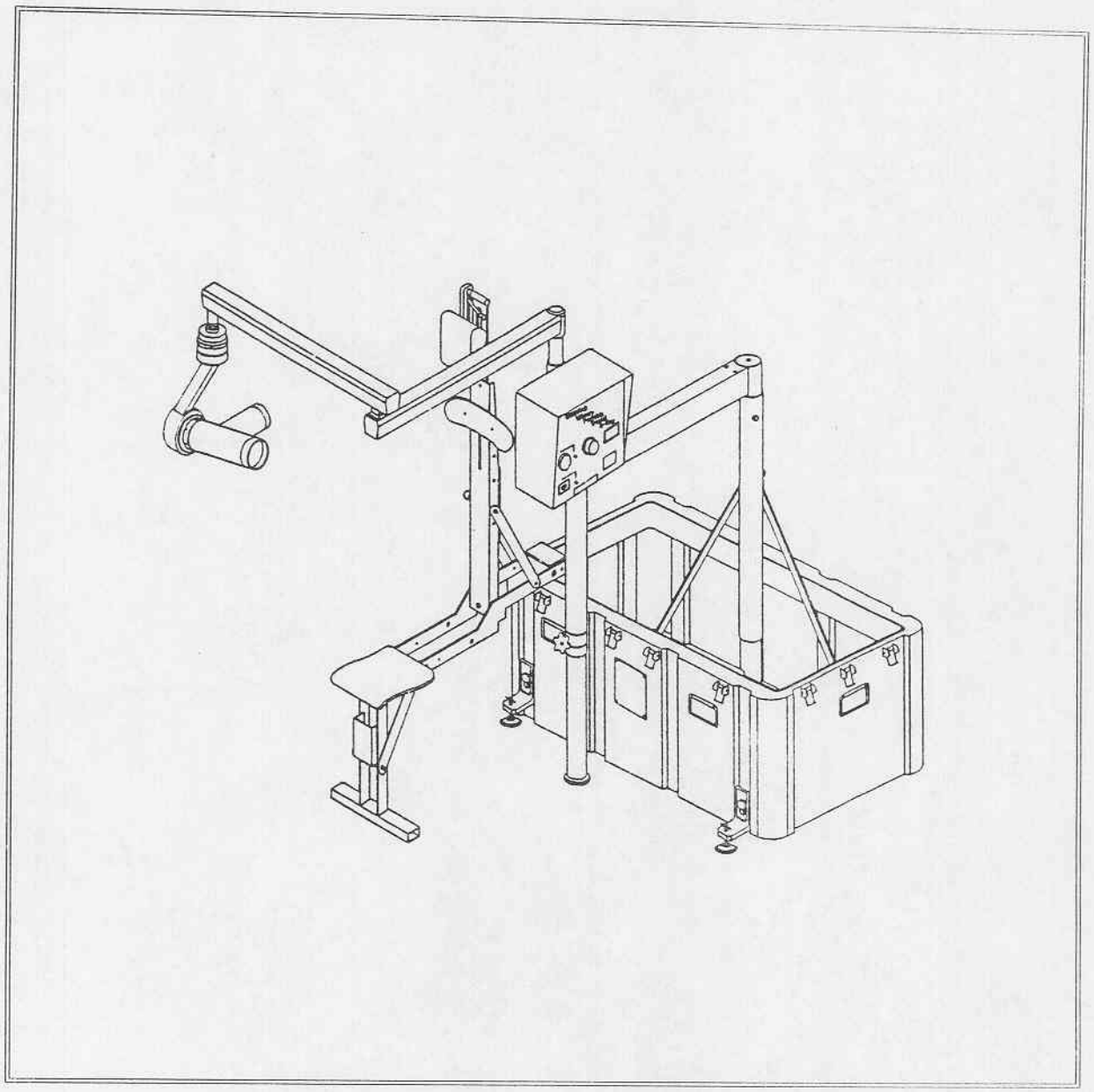
MAINTENANCE MANUAL

for the

ALPHA MPDX

PORTABLE DENTAL X-RAY SYSTEM

N.S.N. 6525-01-370-7552



DYNARAD Corp.
19 Jefryn Blvd. West
Deer Park, NY 11729

HOW TO USE THIS MANUAL

The manual is intended to provide an easily usable source of reference that will assist in the understanding the basics of assembly, operation and maintenance of the ALPHA MPDX Portable Dental X-Ray System. The manual is arranged in seven sections, each of which will support a particular function of the X-Ray System. A complete table of contents, list of illustrations, list of tables and an index are included to assist in the location of information contained in the manual.

PARAGRAPH, PAGE, FIGURE, AND TABLE NUMBERING SYSTEM

All paragraphs, pages, figures, and tables are assigned numbers keyed to the section and sequence in which they appear. For example, Figure 2-1 is the first figure in Section 2, and Figure 2-2 is the second figure in Section 2.

When reference designators or part numbers are required as part of an instruction or procedure, they are enclosed in parentheses.

CONTENTS

The information presented in each section of this manual is as follows:

Section I - General Description. This section introduces the content of the manual; describes the X-Ray System, its purpose, function, and capabilities; and provides a table of leading particulars. Each major assembly of the X-Ray System is illustrated.

Section II - Assembly and Preparation for Use. This section provides the instructions necessary to unpack and assemble the ALPHA MPDX.

Section III - Operation. This section contains the ALPHA MPDX Portable Dental X-Ray System Operating Instructions.

Section IV - General Theory of Operation. This section provides a functional block description of the X-Ray System and also describes the function of each major assembly.

Section V - Maintenance/Troubleshooting. This section provides scheduled preventive maintenance (inspection, cleaning, and lubrication) instructions for the X-Ray System. This section also provides a troubleshooting chart, calibration and adjustment procedures, and special replacement procedures.

Section VI - Parts Catalog. This section includes a listing of parts, and reference to supporting diagrams.

Section VII - Diagrams. This section contains the x-ray system maintenance diagrams.

The ALPHA MPDX Portable Dental X-Ray System, manufactured by Dynarad Corp., 19 Jefryn Blvd. West, Deer Park, NY 11729 USA, provides high quality dental X-ray capability in a portable format. It is intended for dental applications where a compact, rugged, and highly mobile dental X-Ray System is required. The system complies with the requirements of the United States Department of Health and Human Services for mobile and special purpose radiographic equipment, when operated, maintained and repaired in accordance with the instructions in this manual.

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SAFETY SUMMARY

Certain safety precautions are unique to the ALPHA MPDX Portable Dental X-Ray System, and must be observed at all times by all personnel.

The following are general safety precautions not related to any specific procedures and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe all safety regulations.

Do not replace components or make adjustments inside the equipment with any high voltage power supply turned on. Under certain conditions, dangerous potentials may exist when the power control is in the OFF position, due to charges retained by capacitors. To avoid injury, always remove power and discharge and ground a circuit before touching it.

DO NOT SERVICE OR ADJUST ALONE

Under no circumstances should any person reach into or enter the enclosure for the purpose of servicing or adjusting the equipment except in the presence of someone who is capable of rendering aid.

RESUSCITATION

Personnel working with, or near, high voltages should be familiar with modern methods of resuscitation. Such information may be obtained from the Bureau of Medicine and Surgery.

FOR YOUR INFORMATION

The following keys are included throughout this manual to bring your attention to certain procedures and precautions. Each of these keys is intended for the following purposes:

NOTE: To highlight an instruction or procedure that requires special attention.

CAUTION: To bring your attention to an instruction or procedure which, if improperly performed, could damage the equipment.

WARNING: To bring your attention to an instruction or procedure which, if improperly performed, could cause bodily injury to the operator, maintainer and/or patient.

The following cautions and warnings should be observed:

CAUTION

The X-Ray System is not designed to withstand an air drop.

WARNING

The X-Ray System in its Carrying Case is very heavy (190 lbs). To avoid personnal injury, exercise care when lifting. Two (2) men are required to lift the Carrying Case or the Carrying Case Cover.

WARNING

Personnel working with or near X-radiation should be fully acquainted with the recommendations of the National Committee on Radiation Protection as published in the National Bureau of Standards Handbooks and the International Commission of Radiation Protection, and should take adequate precautions to protect against injury. X-ray equipment, if not properly used, can cause injury. The X-Ray System incorporates a high degree of protection against X-radiation, however, there is no way to provide complete protection. The X-Ray System operators and maintainers must take normal precautionary steps to avoid unwisely or unknowingly exposing themselves or others to direct or secondary radiation. It is mandatory that all persons authorized to use the equipment are aware of the danger of excessive exposure to X-radiation and that these persons be properly trained and instructed. Various protective devices and materials are available. It is urged that such devices and materials be used.

WARNING

To avoid injury to inexperienced personnel, only trained and qualified personnel should be permitted access to the internal portions of the X-Ray System.

WARNING

Adjustments of resistors must be performed with all power to the X-Ray System turned off. Failure to turn off power could result in bodily injury to servicing personnel.

WARNING

Dangerous voltages are present inside the X-Ray Control Assembly (1A1). Failure to turn off power could result in bodily injury to servicing personnel.

RECORD OF CHANGES

CHANGE NO.	DATE	TITLE OR BRIEF DESCRIPTION	ENTERED BY

SECTION 1

GENERAL DESCRIPTION

1-1 INTRODUCTION

This manual provides operating and service instructions for the ALPHA MPDX Portable Dental X-Ray System, hereinafter referred to as the X-Ray System (Figure 1-1). The X-Ray System is manufactured by Dynarad Inc., Deer Park, NY 11729.

This manual consists of seven sections as follows:

Section I	General Description
Section II	Assembly and Preparation for Use
Section III	Operation
Section IV	General Theory of Operation
Section V	Maintenance/Troubleshooting
Section VI	Parts Catalog
Section VII	Diagrams

1-2 CAPABILITIES AND LIMITATIONS

The ALPHA MPDX Portable Dental X-Ray System (hereinafter referred to as the X-Ray System) is designed for use as a portable, intra-oral radiology system.

1-2.1 System Capabilities

The X-Ray System is designed to operate with an electrical power input of 110 to 240VAC, at 50 to 60 Hz. The X-Ray System delivers a tube current of seven milliamps DC, at a constant potential of 70 kilovolts (kV). The duty cycle is one second of operation in 60 seconds. Exposure times are from 0.012 through 2.0 seconds, in 22 steps.

1-2.2 System Limitations

The X-Ray System is certified in accordance with, Department of Health and Human Services Regulation, Title 21, Subchapter J, Code of Federal Regulations for Radiation Generating Equipment. The X-Ray System meets the requirements of Underwriter's Laboratories, Inc. Standard UL 187 (X-Ray Equipment- Dielectric Voltage Withstand), as well as the ANSI/AAMI Standard for Safe Current Limits for Electromedical Apparatus.

1-3 PURPOSE AND FUNCTION

The X-Ray System is a lightweight, portable, intra-oral, dental X-ray system, intended for use in small medical units, field hospitals, and for general-purpose dental examinations.

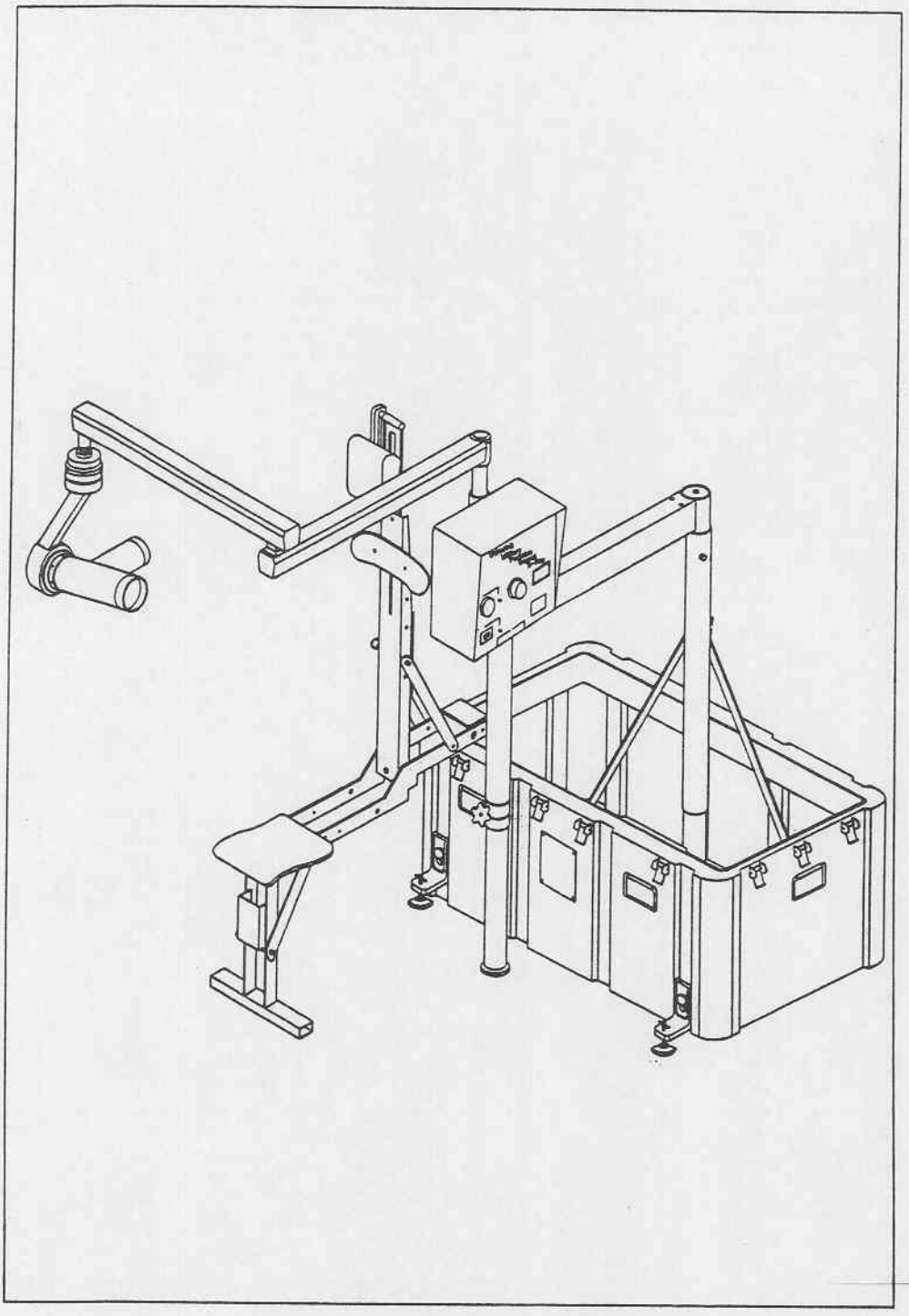


Figure 1-1. ALPHA MPDX Portable Dental X-Ray System

Table 1-1 lists the leading particulars of the X-Ray System. Table 1-2 is a list of items supplied.

Table 1-1. System Leading Particulars

PERFORMANCE SPECIFICATIONS

kVp:	70 kVp nominal; plus/minus 10% constant potential. kVp measurements performed with Keithley kVp Divider, Model No. 35080 and Hitachi Model VC-6020, Storage Oscilloscope, or equivalent.
mA:	7 mA DC plus/minus 10%. Milliampere (mA) current measurements are taken using a Hitachi Storage Oscilloscope Model VC-6020, or equivalent.
Exposure time:	Selected by means of a 22-position rotary switch (12ms to 2.00 seconds in 22 steps, +/-10%, plus +/-4ms). Measurements performed with Keithley Model No. 35050 Dosimeter and Hitachi Model VC-6020, Storage Oscilloscope, or equivalent, at the 50% level.

POWER

Line voltage:	110 VAC, to 240VAC, 50/60 Hz.
Line voltage regulation:	5% max. load
Technique factor for maximum line current:	70 kV,7mA
Maximum line current:	7 amps - @ 120 VAC line power 3.5 amps - @ 220 VAC line power
BEAM ANGLE	12° maximum
FOCAL SPOT SIZE	.5 mm square (NEMA)
TARGET MATERIAL	Tungsten
POWER SUPPLY TYPE	High frequency constant potential
MINIMUM PERMANENT FILTRATION	1.5 mm aluminum, or equivalent at 70 kV.

Table 1-1. System Leading Particulars - Continued

LEAKAGE TECHNIQUE FACTORS	Leakage test performed @ 70 kVp and 0.7 mA output power, one (1) second per side. (mR x 60 = mR/hour.)
WEIGHT	In Carrying Case - 190 pounds
SHIPPING CRATE DIMENSIONS	46 in.(long) X 28.5 in. (wide) X 30 in. (high), Volume 22.76 ft^3
COOLING CURVES AND DUTY CYCLE	In order to allow proper tube cooling between exposures, the system contains an automatic inhibit circuit that provides a time delay of 15 seconds between exposures. (See Figures 1-2 through 1-5 for X-Ray Tube Radiographic Rating, Filament Characteristics and Cooling Curves.)

X-RAY TUBE TECHNICAL SPECIFICATIONS

Envelope:	Hard glass throughout
Focus:	0.5mm (NEMA)
Target Angle:	12 degrees
Maximum Anode Cooling Rate:	20,000 Heat Units/minute
Anode Heat Storage Capacity:	20,000 Heat Units (14,000 Joules)
Maximum Useful Voltage:	95 kVp

Filament Characteristics

Voltage Range:	3.0 to 4.0 volts
Current Range:	1.9 to 2.2 amps

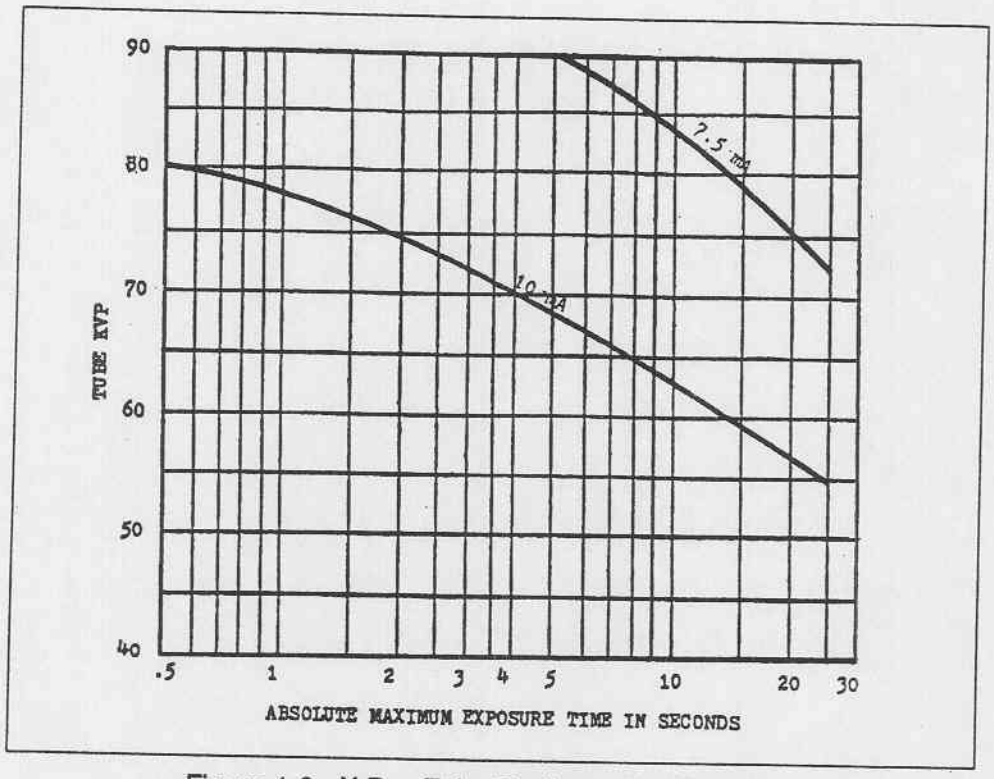


Figure 1-2. X-Ray Tube Radiographic Rating

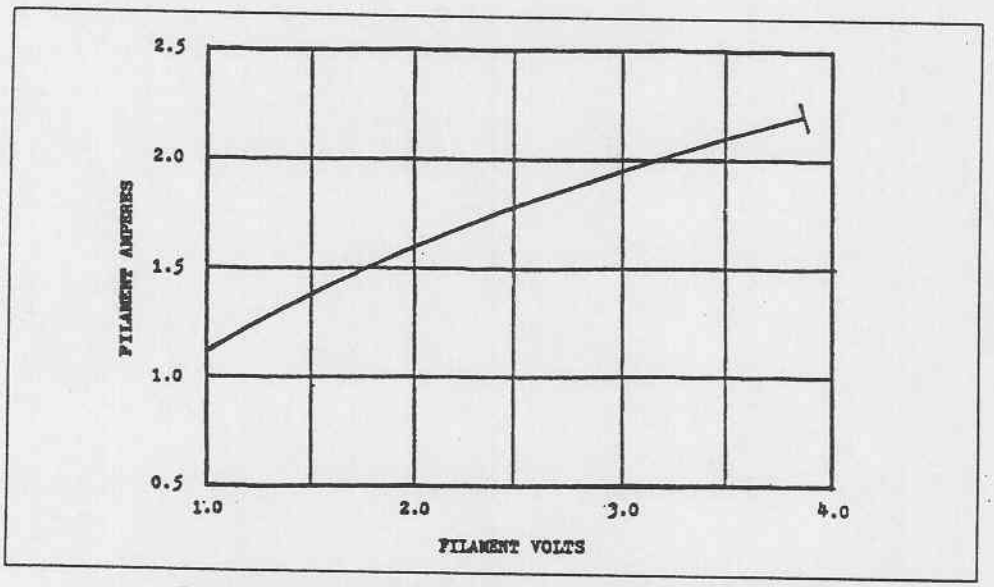


Figure 1-3. X-Ray Tube Filament Characteristics

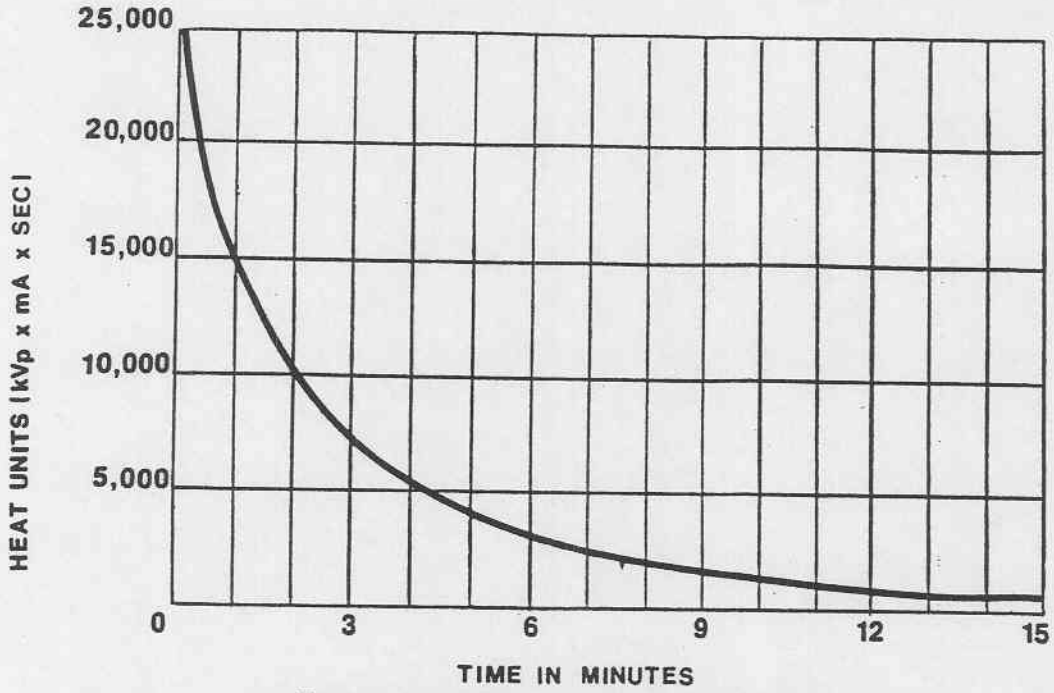


Figure 1-4. X-Ray Tube Anode, Cooling Curve

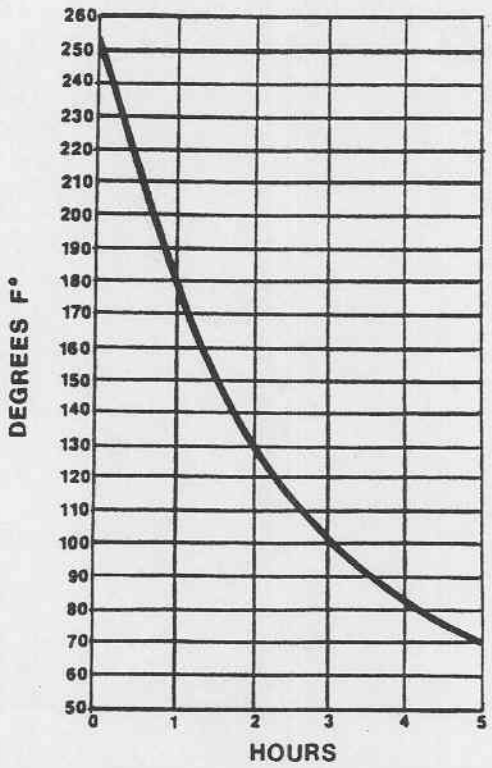


Figure 1-5. X-Ray Tube Head Assembly, Cooling Curve.

Table 1-2. List of Items Supplied

Item	Qty	Part No.
X-Ray Unit (Unit 1)	1	500876
Chair Unit (Unit 2)	1	500892
Carrying Case Unit (Unit 3)	1	500883
Operation Manual	2	500893/OM
Maintenance Manual	2	500893/MM

NOTE

A complete inventory of parts shipped in the Carrying Case and the Carrying Case Cover is provided in paragraph 2-4 in Section 2 of this manual.

1-4 DESCRIPTION

A physical description and illustration of each of the system's major units is provided in the following paragraphs and figures.

The system is shipped in a Carrying Case (Unit 3). Whenever the system is transported to another site, it will be repacked in the Carrying Case . The system is designed for rapid assembly or disassembly prior to, or after, transport.

1-4.1 X-Ray Unit (Unit 1)

The X-Ray Unit (Unit 1) contains: the X-Ray Control Assembly (1A1), the X-Ray Source Assembly (1A2) and the Scissor Arm Assembly (1A3), each of which is described in the following subparagraphs.

1-4.1.1 X-Ray Control Assembly (1A1)

Major components of the X-Ray Control Assembly (see Figure 1-1) are:

- Control Board Subassembly (1A1A1)
- Timer Switch Board Subassembly (1A1A2)
- Anode Supply Subassembly (1A1A3)
- Cathode Supply Subassembly (1A1A4)
- Capacitor Board Subassembly (1A1A5)
- Panel Subassembly (1A1A6)
- Exposure Switch Subassembly (1A1A7)
- Line Filter Subassembly (1A1LF1)
- X-Ray Control, Harness Subassembly (1A1A9)
- Line Cord (1A1W1)

1-4.1.2 X-Ray Source Assembly (1A2)

The X-Ray Source Assembly (1A2) (see Figure 1-1) contains the following major components:

- X-Ray Head Subassembly (1A2A1)
- Dental Cone (1A2A2)

1-4.1.2.1 X-Ray Head Subassembly (1A2A1). The X-Ray Head Subassembly (1A2A1) contains: the X-ray tube, the case and the high- voltage cables, sealed in an epoxy-filled, non-repairable subassembly.

1-4.1.2.2 Dental Cone Subassembly (1A2A2). The Dental Cone Assembly is attached to the X-Ray Head Subassembly via a threaded fitting.

1-4.1.3 Scissor Arm Assembly (1A3).

The Scissor Arm Assembly (1A3) is part of X-Ray Unit 1. The Scissor Arm Assembly supports the X-Ray Source Assembly (1A2) and permits positioning of the X-ray head in all necessary diagnostic positions.

1-4.2 Chair Unit (Unit 2)

The Chair Unit (Unit 2) major components include: the seat, backrest, headrest and corresponding mechanical supporting assemblies. The Chair Unit is collapsible for packing in the Carrying Case. The headrest is secured to the back of the seat assembly.

1-4.2.1 Headrest Assembly (2A1)

The headrest can be horizontally and vertically adjusted and then locked in place.

1-4.3 Carrying Case Unit (Unit 3)

The spun-molded, polyethylene Carrying Case Unit (Unit 3) (see Figure 1-1) is used to store and transport the X-Ray System and to provide the structural framework required to support the X-Ray Unit (Unit 1) and the Chair Unit (Unit 2) during operation. The contents of the Carrying Case includes: a set of four leveling brackets/leveling pads, which are attached to the Carrying Case during assembly/setup, a steel frame, mounting posts for the Extension Tube and for the Chair Unit, as well as shipping/retaining straps. The case also includes provision for housing a dental processor. Refer to paragraph 2-4 in Section 2 of this manual for a complete inventory of the carrying case contents.

SECTION 2

ASSEMBLY AND PREPARATION FOR USE

2-1 INTRODUCTION

This section contains, facility requirements for installation, unpacking and inspection procedures, assembly/setup procedure, the procedure for inspection after assembly and required adjustments after assembly of the X-ray system units.

2-2 FACILITY REQUIREMENTS FOR INSTALLATION

The X-ray system facility requirements are: a stable mounting site, accessibility to electrical power, and proximity to support equipment (i.e., X-ray film processing).

2-2.1 Power Requirements.

Power requirements for the ALPHA MPDX Portable Dental X-Ray System are as follows:

Line voltage 110 VAC to 240 VAC , at 50/60 Hz. range:	Operation automatically controlled.
Line voltage regulation:	±5% max load
Technique factor for maximum line current:	70 kV - 7 mA DC
Maximum line current:	7 amps - 120 VAC line 3.5 amps - 220 VAC line

2-3 UNPACKING AND PRE-ASSEMBLY INSPECTION

Upon receipt of the X-Ray System, carefully examine the shipping container exterior for any evidence of mishandling during shipment. If any damage is observed, notify your supervisor immediately.

2-4 ASSEMBLY/SETUP PROCEDURE

The X-Ray System is designed to be assembled without the need for any tools, additional materials, or test equipment. Figures 2-1 through 2-5 illustrate the assembly procedure.

The cover and lower section of the Case Unit each house key components of the X-Ray System. Prior to assembling the X-Ray System, An inventory of major parts should be taken. Check the parts removed against the following list and identify each part in Figure 2-1.

Parts Shipped In Cover

- o Chair Unit
- o Truss Arm
- o Telescopic Leg

Parts Shipped in Case Lower Section

- o X-Ray Unit - comprising the following components:
  - -X-Ray Source Assembly
  - -Scissor Arm Assembly
  - -Control Assembly
- o Two (2) identical steel Support Braces
- o Extension Tube
- o Four (4) Leveling Foot Assemblies
- o Dental Cone
- o Line Cord
- o Exposure Switch
- o Two (2) Operation Manuals
- o Two (2) Maintenance Manuals

Assemble the X-Ray System in the following sequence:

CAUTION

The Case Unit Cover is heavy and should be removed by two (2) men to avoid the possibility of dropping the Cover and consequently causing injury to personnel and damage to the equipment.

1. Open the Carrying Case, Unit 3. Unpack the contents of the carrying case cover and lower section, by removing or releasing the thumbscrews, brackets and straps that secure the X-ray system components during shipping. Initially unfasten the Velcro Straps holding X-Ray Unit (X-Ray Source Assembly, Scissor Arm Assembly and Control Assembly) to the inside front of the lower section of the case unit and remove the X-Ray Unit. Release the latch holding the Scissor Arm Assembly in the folded position. Unfasten the Velcro Straps securing the Extension Tube to the back of the lower section of the Case Unit and remove the Extension Tube.
Remove the Exposure Switch which is stored in a buttoned pouch, attached to the short end of the lower section. There are no special instructions required to remove the remaining components from the base of the lower section of the case unit.

Loosen the thumbscrews that secure the truss arm shipping brackets in the inside of the Case Unit Cover. Open the shipping brackets and remove the Truss Arm. Remove the wing nut securing the Chair Unit to the shipping bolt. (To avoid losing the wing nut, temporally fasten it to the shipping bolt.) Unfasten the built-in strap on the inside of the Case Unit Cover and lift out the Chair Unit. Lift the Telescopic Leg straight out of the snap-in retainers mounted in the Case Unit Cover.

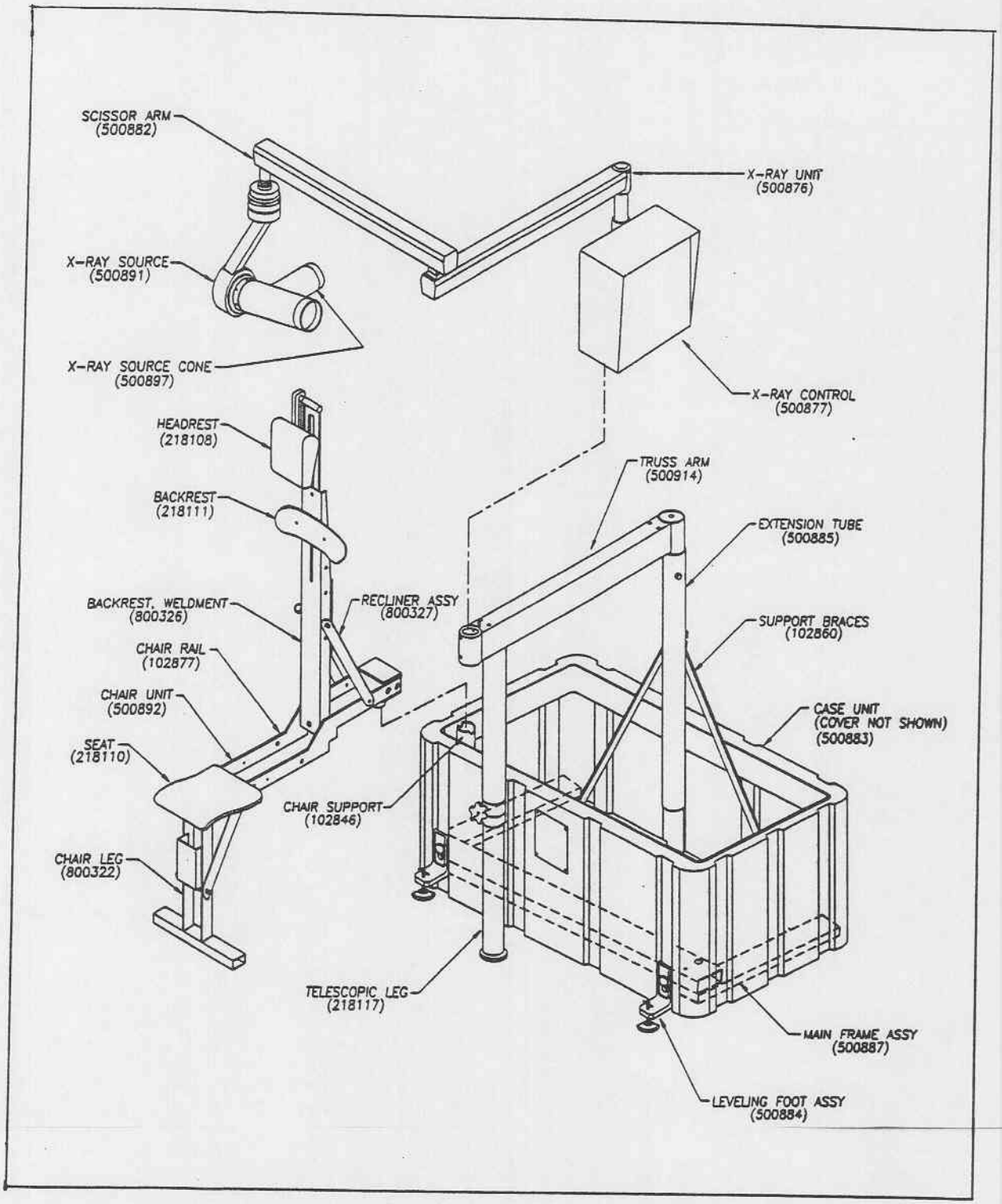


Figure 2-1. ALPHA MPDX Portable Dental X-Ray System, Assembly Diagram

2. Install each of the four (4) Leveling Foot Assemblies, two each on each long side of the case. Note that each leveling foot bracket includes a key-hole cutout, see Figure 2-2(A) which fits over the associated mounting hub built into the lower edge of the case. After positioning the key hole over mounting hub, lift up on the leveling foot to snap it into place.
Perform initial adjustment of the thumbscrew on each leveling foot to complete preliminary leveling of the case. (Turning the thumbscrew in a clockwise direction extends the leveling pad, turning the thumbscrew counter-clockwise, retracts the leveling pad.)

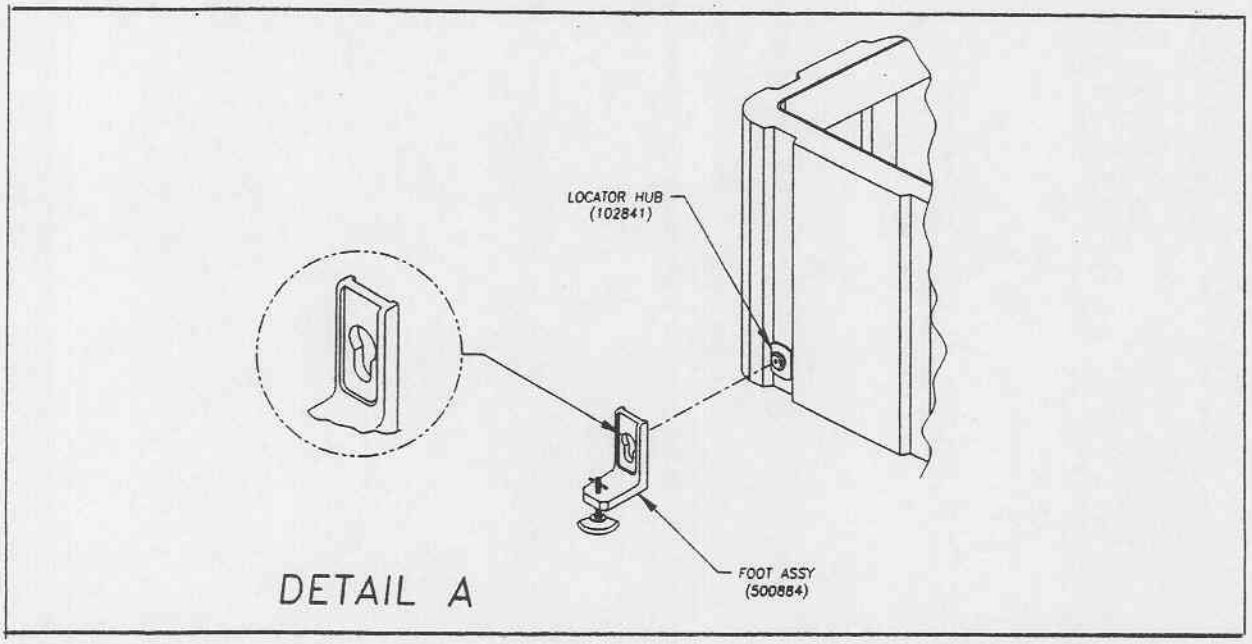


Figure 2-2. Assembly Detail A

3. Insert the Extension Tube into the mount built into the Main Frame Assembly. Ensure that the orientation of the Extension Tube is exactly as shown in Figure 2-3(B). The positioning of the Extension Tube is critical to proper installation of the Support Braces and secure tightening of thumbscrews.

4. The two (2) identical, steel Support Braces must be loosely mounted on the Main Frame Assembly, located in the base of the lower section of the case, and to the Extension Tube (See Figure 2-3(B). Loosen the two (2) thumbscrews on the Main Frame Assembly and the two (2) on the Extension Tube, before proceeding with this installation.

NOTE

Both Support Braces are manufactured with different angles at each end to provide maximum support for the Extension Tube and to ensure that each Support Brace is properly mated at each end to the respective shaft and thumbscrew in each of the Main Frame Assembly and Extension Tube. The end of each support tube that mates with the extension tube is marked with a decal arrow, that points toward the extension tube.

If the mounting slot in the end of the Support Brace cannot be aligned with the shaft and thumbscrew in either the Main Frame Assembly or the Extension Tube, turn the Support Brace around and try aligning the other end. After each Support Brace has been properly mated with its shaft and thumbscrew, hand tighten each thumbscrew to secure each Support Brace.

5. Install Truss Arm on Extension Tube, as shown in Figure 2-3(B). Ensure that the Truss Arm is properly seated.

6. Insert the Telescopic Leg into the fitting on the underside of the Truss Arm. Ensure that the Telescopic Leg is properly seated, see Figure 2-3(B). Loosen wing nut on lower part of telescopic leg and extend leg to the floor.

NOTE

A bubble-type, bull's eye Level is built into the top of the Extension Tube to assist the installer in leveling the unit.

7. Using the Level in the top of the Extension Tube, adjust the Telescopic Leg, Extension Tube, Support Braces (2) and Leveling Feet (4) as required to center the bubble within the circle on the Level.

8. When the unit is level, securely tighten the four (4) thumbscrews on the Support Braces and also tighten the wing nut on the Telescopic Leg.

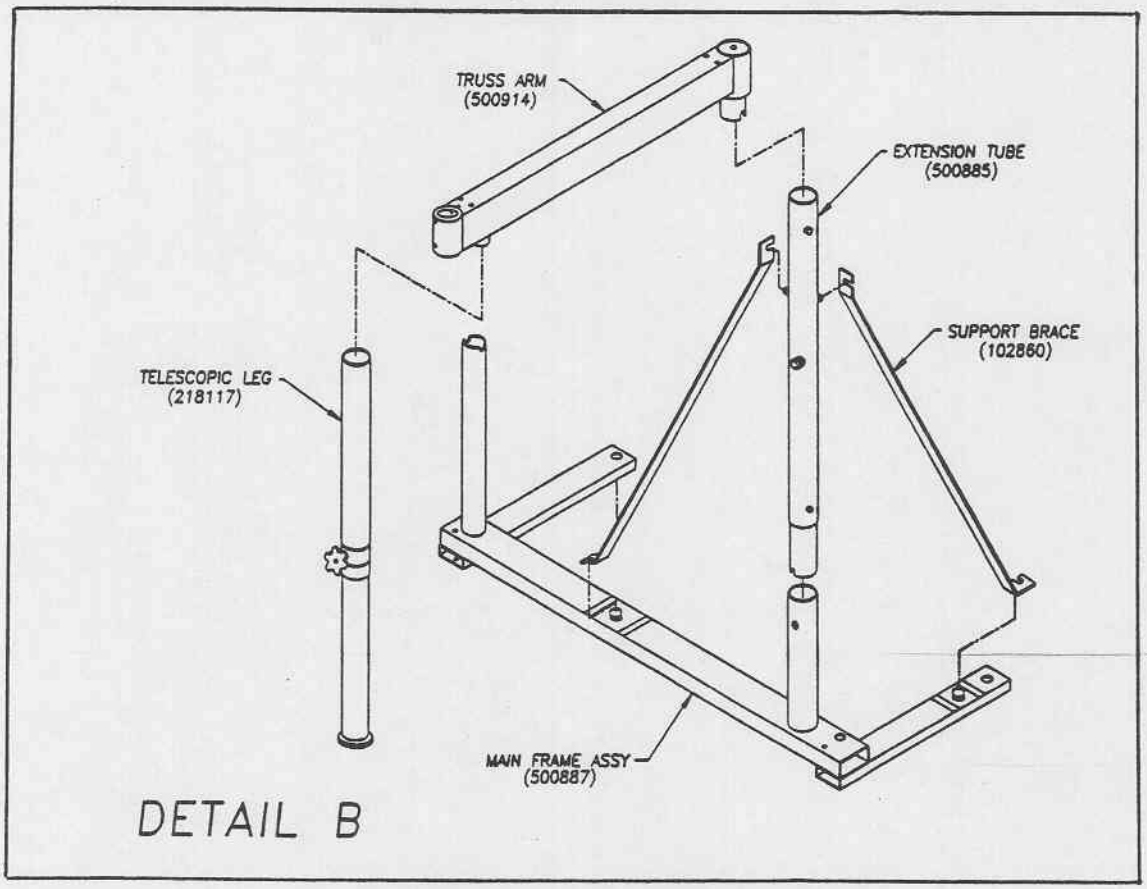


Figure 2-3. Assembly Detail B

2-4 ASSEMBLY/SETUP PROCEDURE (Continued)

9. Ensure that the latch holding the Scissor Arm Assembly in the folded shipping position has been released during unpacking. Install the Control Assembly of the X-Ray Unit on the Truss Arm by inserting the male fitting on the Control Assembly into the receptacle on the Truss Arm. Ensure that the notch in the Control Assembly Mounting Tube is engaged with the Dowel Pin, located adjacent to the receptacle, in the Truss Arm, see Figure 2-4(C).

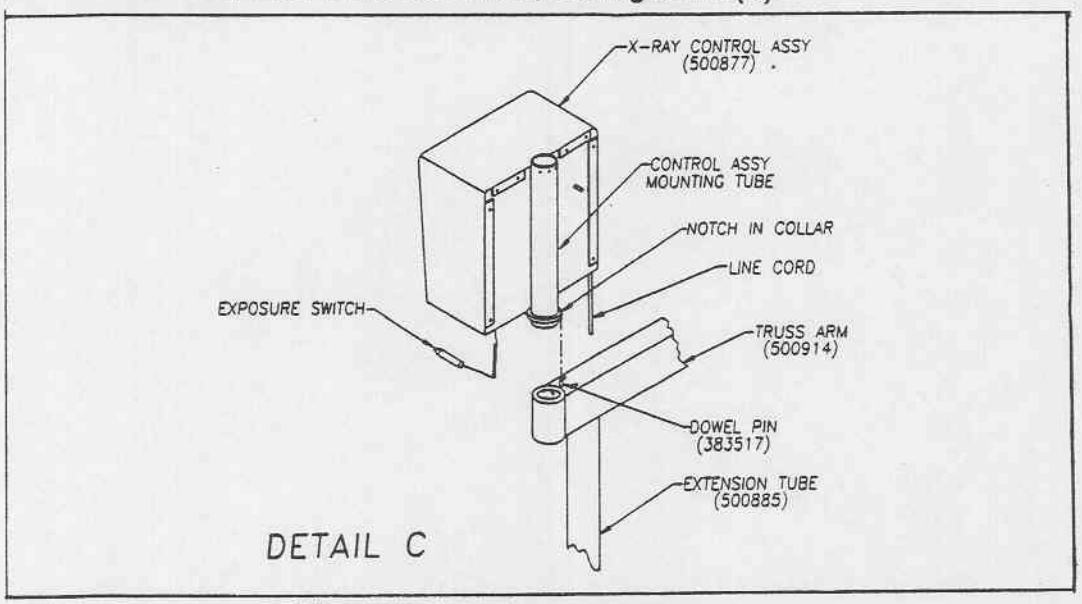


Figure 2-4. Assembly Detail C

10. Install the Chair Unit by inserting the male fitting at the bottom/rear of the chair rail, into the Chair Support mounted on the Case Main Frame Assembly, see Figure 2-5(D) . Ensure that the pin built into the male fitting is properly seated in the notches in the chair support fitting.

11. Remove the Chair Unit Quick-Release Locking Pin located on the Chair Rail (see Figures 2-1 and 2-5(D) and lift the Backrest Weldment to an upright position.

NOTE

Three (3) holes are provided for insertion of the Locking Pin in the Backrest Weldment. To adjust the Backrest Weldment for any one of three (3) recliner angles, align the hole in the Recliner Assembly with the hole in the Backrest Weldment that represents the selected angle of recline. Reinsert the Quick Release Locking Pin through the Recliner Assembly and into the selected hole in the Backrest Weldment.

12. Remove the Quick Release Locking Pin located underneath the Chair Unit (see Figure 2-5(D). Swing Chair Leg down until the leg is squarely set on the floor. Align the holes in the Limit Arm with the holes in the Chair Leg and reinstall the Locking Pin.

13. Loosen the Star Knob behind the Headrest on the Backrest Weldment. Adjust the Headrest to the desired position, up or down, and retighten the Star Knob.

2-4 ASSEMBLY/SETUP PROCEDURE (Continued)

14. To initially adjust the position of the Headrest, closer to, or further away from the patient position, set the Headrest Locking Lever ,see Figure 2-5(D), to the unlocked (up) position. Adjust the Headrest to the position of your choice and lock the Headrest in that position by moving the Headrest Locking Lever to the locked (down) position.

NOTE

The position of the Headrest should be adjusted for the comfort of each patient.

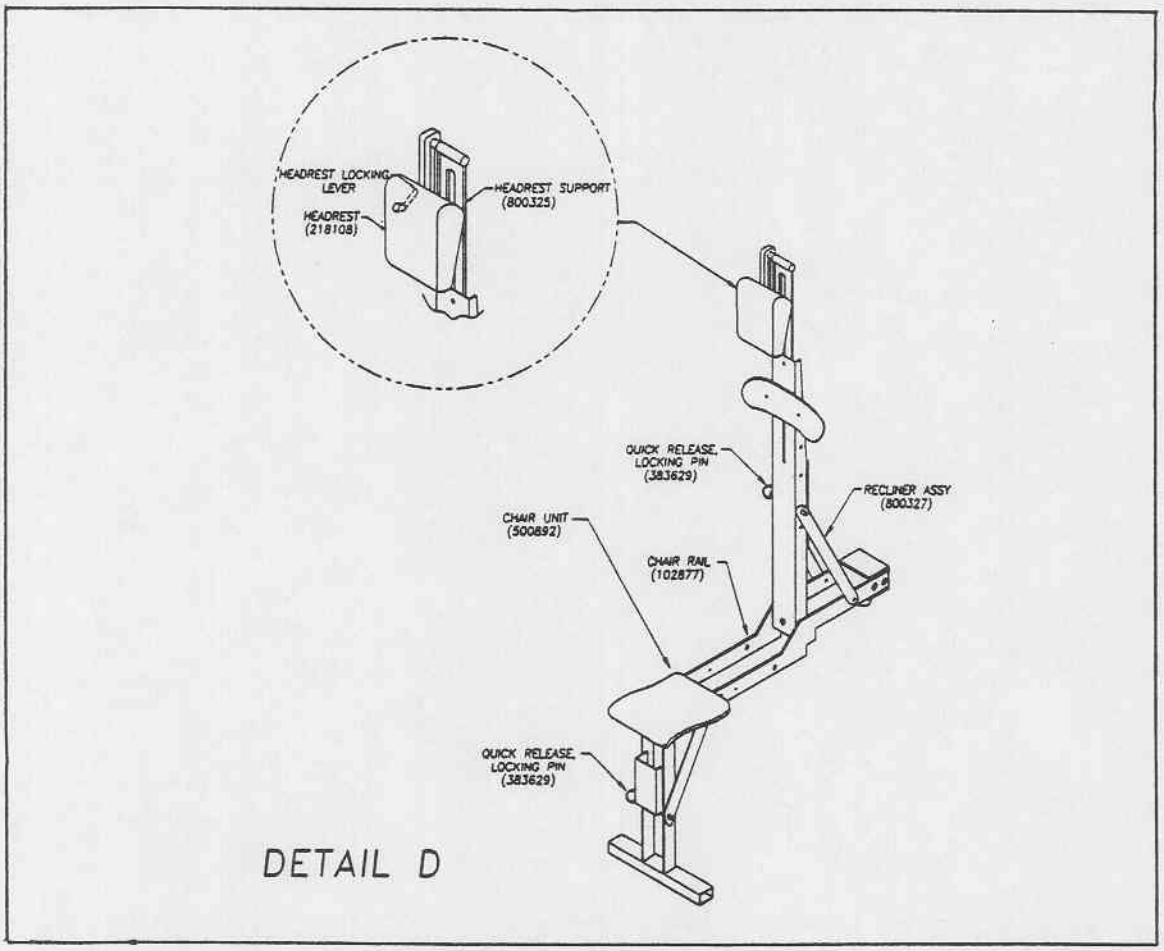


Figure 2-5. Assembly Detail D

15. Install the X-Ray Dental Cone (which is shipped in the foam cutout in the base of Case Unit). The Dental Cone should be mounted on the threaded male receptacle on the X-Ray Source Assembly (see Figure 2-1). Engage the threads on the male receptacle and turn the Cone in a clockwise direction until it is hand tight.

16. Install the Exposure Switch in the X-Ray Control by plugging the jack end into the jack receptacle on the underside of the X-Ray Control, next to the power receptacle. (See Figure 2-4(C).

CAUTION

To prevent possible damage from power surges, always plug the Power Cord into the X-Ray System before plugging into the power source.

17. Insert the Power Cord into the power receptacle, next to the exposure switch jack, on the underside of the Control Assembly, see Figure 2-4(C).

2-5 INSPECTION AFTER ASSEMBLY

The following inspection procedures must be performed after the X-Ray System is assembled and prior to placing the X-Ray System into operation.

1. Ensure that all Quick Release Pins are fully inserted and locked in place.

2. Ensure that all locking knobs are hand-tight (full clockwise position).

3. Verify the security of the Cone installed on the X-Ray Control Assembly.

4. Check security of all electrical connectors.

5. Verify that all labels are securely affixed and legible.

6. Thoroughly inspect the assembled X-Ray System for: tight fittings, possible missing parts (including the Operation and Maintenance Manuals), frayed electrical cords, cracks, chips, excessive wear or other signs of deterioration.

7. Using a lint-free cloth, remove any noticeable dirt or excess dust from the assembled unit.

8. Check X-Ray Head Subassembly 1A2A1 in all working positions for possible drift.

9. Check Scissor Arm Assembly 1A3 in all working positions for ease of motion.

WARNING

To avoid potential injury to both patient and operator, the user is **NOT** permitted to use this X-Ray System if any damage that could affect radiation safety is observed, until such damage is repaired and the potential radiation hazard is eliminated.

10. Refer to paragraph 3-3, in Section 3 of this manual, for the Preoperational Checkout Procedure.

2-6 DISASSEMBLY/REPACKING PROCEDURE

Disassembly of the X-Ray System for repacking and possible reshipment is essentially the reverse of the assembly procedure provided in paragraph 2-4, with some specific instruction in regard to sensitive components. This procedure provides general instructions for disassembly where general procedures are adequate and detailed instructions as required to safely disassemble the X-Ray System while avoiding any possibility of damage to one or more of the components. (See Figures 2-1 through 2-5.)

1. Unplug and remove the Power Cord. Store the Power Cord in the case lower section.

2. Unplug and remove the Exposure Switch. Store the Exposure Switch in the buttoned pouch in the lower section of the Case Unit.

3. Remove the Dental Cone from the X-Ray Source Assembly. Carefully store the Dental Cone in the foam cutout in the base of the Case Unit.

4. Loosen the Star Knob that holds the Headrest in place. Slide the Headrest to the desired stored position on the Backrest Weldment and retighten the Star Knob.

5. Remove the Quick Release Locking Pin located underneath the Chair Unit. Swing the Chair Leg up to the stored position. Align the holes on the Chair Leg with the holes on the Limit Arm and insert the Quick Release Locking Pin.

6. Remove the Quick Release Locking Pin that is positioned through the Recliner Assembly into the Backrest Weldment. Fold the Backrest Weldment down to the stored position. Insert the Quick Release Locking Pin through Chair Rail into the Backrest Weldment.

7. With the Chair Unit and Backrest Weldment folded and locked in the stored position, lift the Chair Unit free of the Case Main Frame Assembly Chair Support. Set the Chair Unit into shipping position in the Case Unit Cover, align shipping bolt in Cover with mating hole in the Chair Unit. Fasten the chair unit shipping strap (built into the Cover) over the Chair Unit and tighten it securely. After the Chair Unit is set in place, fasten the wing nut over the shipping bolt and turn wing nut until hand tight.

8. Disconnect the Control Assembly from the Truss Arm. Lock the Scissor Arm Assembly in the folded position by securing the built-in latch, around the control assembly mounting tube, above the collar. Store the complete X-Ray Unit in the lower section of the Case Unit.

9. Loosen the wing nut on the Telescopic Leg, collapse the Telescopic Leg and retighten the wing nut with the leg in the collapsed position. Remove the Telescopic Leg from the fitting on the underside of the Truss Arm. Store the Telescopic Leg in the snap-in retainers in the Case Unit Cover.

10. Disconnect the Truss Arm from the Extension Tube. Store the Truss Arm in the two shipping brackets in the Case Unit Cover. Secure Truss Arm by tightening the thumbscrews built into the brackets.

11. Loosen the thumbscrews holding the Support Braces to the Extension Tube and to the Main Frame Assembly. Remove the Support Braces and store them in the lower section of the Case Unit.

SECTION 3

OPERATION

3-1 INTRODUCTION

This section contains the operating instructions for the X-Ray System. Paragraph 3-2 describes the functions of the X-ray system controls and indicators. Paragraph 3-3 describes the preoperational checkout procedures and paragraph 3-4 provides the X-ray system operating procedures.

3-2 FUNCTIONS OF CONTROLS AND INDICATORS

The X-ray system operating controls and indicators are contained in the X-Ray Control Assembly (1A1) in Unit 1. The X-ray control assembly controls and indicators are located and identified in Figure 3-1. Table 3-1 provides the function of each operating control and indicator.

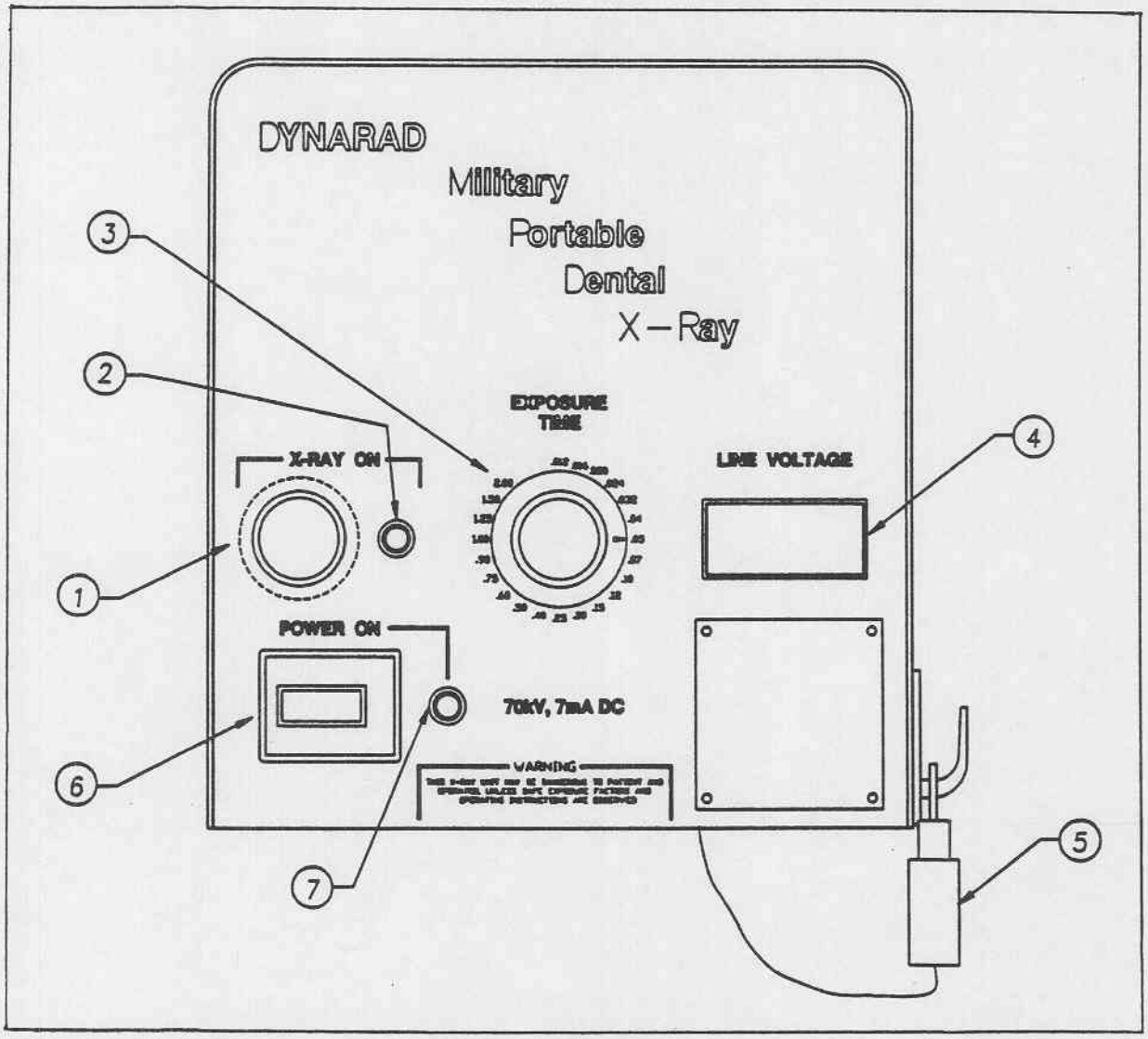


Figure 3-1. X-Ray Control Assembly (1A1), Location of Operating Controls and Indicators

Table 3-1. X-Ray Control Assembly (1A1), Functions of Controls and Indicators

Figure 3-1 Index No.	Control/ Indicator	Function
1	Buzzer	Emits an audible tone when X-Rays are being generated. The buzzer sounds simultaneously with the X-Ray generation, except for very short exposures, the tone duration is extended to 1 second, to make it easier for the operator to hear.
2	X-RAY Indicator	A solid-state, light-emitting diode (LED) illuminates when X-Rays are being generated. This occurs during the same time interval as the buzzer.
3	TIMER Switch	A rotary switch that provides for selection of exposure time from .012 to 2.0 seconds.
4	Line Voltage Display	Indicates the line voltage in use.
5	Exposure Switch	A momentary-action, hand-operated switch that controls operation of the X-ray beam. This is a "dead man" type switch and must be pressed continuously during the exposure. Releasing the switch will terminate the exposure and reset the timer.
6	POWER ON Switch/ Circuit Breaker	A switch/circuit breaker that controls primary power to X-Ray Unit 1. Operating the switch turns the unit on. Power should not be turned on until the X-Ray System is ready to use and should be turned off after use.
7	POWER ON Indicator	A red neon lamp that illuminates when the power is on.

3-3 PRE-OPERATIONAL CHECKOUT

This paragraph provides the X-ray system pre-operational checkout procedures, which must be performed prior to daily operation, or first time operation, of the X-Ray System.

NOTE

Prior to performing the Pre-Operational Checkout Procedure, verify that the X-Ray System Inspection Procedure, provided in paragraph 2-5 in Section 2 of this manual, has been successfully completed.

a. Check the line power plug connection to the line power receptacle.

b. Check security of the electrical connection between X-Ray Control Assembly 1A1 and X-Ray Unit 1.

c. Cover the cone port with lead shielding.

d. Position the tubehead away from the X-ray unit mounting post (Scissor Arm Assembly fully extended).

e. Set the rotary TIMER Switch to 0.1 second.

f. While holding Exposure Switch, **STEP BACK FROM THE UNIT APPROXIMATELY SIX (6) FEET.**

g. Depress and hold down the Exposure Switch. The X-Ray Indicator light will illuminate and the Buzzer will emit an audible tone. The Exposure Switch will automatically switch off when the time set on the TIMER Switch expires.

h. In the event that either or both of the X-Ray Indicator light or Buzzer fail to function as described in Step g., refer to the Troubleshooting Procedure provided in Section 5 of this manual.

WARNING

To avoid possible injury to patient and operator, **DO NOT** operate the X-Ray System unless all Pre-Operational Checks have been successfully completed.

3-4 OPERATING PROCEDURES

WARNING

Personnel working with or near X-Radiation should be fully acquainted with the recommendations of the National Committee on Radiation Protection as published in the National Bureau of Standards Handbooks and the International Commission of Radiation Protection, and should take adequate precautions to protect against injury. X-Ray equipment, if not properly used, can cause injury. Dynarad's Alpha MPDX Dental X-Ray System incorporates a high degree of protection against X-radiation, however, there is no way to provide complete protection unless the X-Ray System operators take normal precautionary steps to prevent unwisely or unknowingly exposing themselves or others to direct or secondary radiation. It is mandatory that all persons authorized to use the equipment are aware of the danger of excessive exposure to X-radiation and are properly trained and instructed in its use. Protective devices and materials should be available to operators and maintainers of this system. It is urged that such devices and materials be used by the system operators and maintainers.

NOTE

Prior to proceeding with System Operating Instructions, verify that Inspection Procedures and Pre-Operational Checks have been successfully completed.

3-4.1 System Operating instructions.

The step-by-step X-ray system operating procedure should be performed as follows:

1. Set the POWER On/Off,Circuit Breaker/Switch to the On position. The red neon Power On indicator lamp on the X-Ray Unit will illuminate and the Line Voltage Display will indicate the actual line voltage being used by the X-Ray System.

2. In accordance with the X-Ray Exposure Time Selections for Your Site, Table 3-3, set the TIMER switch for the exposure time selected for the x-ray procedure being performed.

3. Seat the patient. Position the x-ray head cone close to, but not touching, the target area of the patient's jaw.

WARNING

Use of a lead apron is recommended to fully protect the patient from X-radiation.

NOTE

The Exposure Switch is a momentary action switch that controls operation of the X-ray beam. The switch **must be depressed continuously** during the exposure; releasing the switch will terminate the exposure and will reset the TIMER.

4. **STEP BACK FROM THE UNIT APPROXIMATELY SIX (6) FEET** and depress the Exposure Switch. Hold the switch in the depressed position until the exposure is complete.

3-4.1.1 Recommended Exposure Times. The enclosed General Recommended Time Selections presented in Table 3-2 may be used as a guide to develop your own radiographic technique. If the exposure time suggested does not produce the density desired, use the space provided in Table 3-3 (Time Selections For Your Site) to write in your preferred time value.

NOTES

Ensure that the film processing solutions are fresh, and that proper processing methods are used. If these precautions are not observed, test films may give misleading indications of optimum exposure time.

Alternate exposure settings should be used to compensate for patients of abnormal size and for edentulous areas. Use approximately one-half the exposure time recommended below for edentulous areas.

To avoid the possibility of film results that are too light, the end of the Dental Cone should be positioned as close to the patient's face as possible.

Table 3-2. General Recommended Time Selections

Examination	Film Speed Group D (Such as Kodak Ultra Speed)	Film SpeedGroup E (Such as Kodak Ektaspeed)
Periapical Anteriors or Bitewing Anteriors	.25	.15
Periapical Posteriors or Bitewing Posteriors	.40	.20

Table 3-3. Time Selections For Your Site

Examination	Film Speed Group D (Such as Kodak Ultra Speed)	Film Speed Group E (Such as Kodak Ektaspeed)
Periapical Anteriors or Bitewing Anteriors		
Periapical Posteriors or Bitewing Posteriors		

3-5 DENTAL X-RAY TECHNIQUES

The following paragraphs provide instructions required to perform the dental techniques to be employed specifically for the Dental X-Ray System. The periapical film techniques and the horizontal angulation procedures are described in paragraphs 3.5.1 and 3.5.2.

3-5.1 Periapical Film Techniques.

The following procedures describe the dental Periapical Film X-Ray Techniques.

a. Patient Seating

1) Technician efficiency

2) Patient comfort

3) Applicance removal

4) Patient history

b. Patient Position

1) Occlusal plane parallel to floor

(A) Maxillary arch (tragus of ear to ala of nose)

(B) Mandibular arch (tragus of ear to corner of mouth)

c. Periapical Exposures

1) Maxillary arch - seven exposures

2) Mandibular arch - seven exposures

3-5.1 Periapical Film Techniques. -Continued.

d. Film Placement

1) Pebbled surface toward unit

2) Dot toward incisal edge or occlusal surface

3) Long axis of film

(A) Posterior exposures (horizontal)

(B) Anterior exposures (vertical)

4) Margin (border) on film

(A) Posterior - 1/4"

(B) Anterior - 1/8"

5) Retaining film position

(A) Patient always holds film

(B) Right or left hand

(1) Thumb (maxillary arch)

(2) Index finger (mandibular arch)

e. Central Ray Angulation

1) Vertical Angulation

(A) Up and down movement of X-ray tube head

(1) Positive (maxillary) - tube head points downward

(2) Negative (mandibular) - tube head points upward

(B) Rule of vertical angulation

(C) Excessive vertical angulation (foreshortening)

(D) Insufficient vertical angulation (elongation)

3-5.2 Horizontal Angulation.

This paragraph describes application of the Horizontal Angulation dental x-ray technique, as follows:

a. Side-to-side movement of tube head

b. Rule of horizontal angulation

c. Incorrect horizontal angulation (overlapping)

Central Ray Direction

a. Center of film

b. Tube or cone almost, but not quite, touching patient

c. Incorrect central ray direction (cone-cutting)

3-6 ROUTINE CARE, MAINTENANCE AND CLEANING PROCEDURES

The Dental X-Ray System requires no special operator care or maintenance procedures, other than an occasional cleaning. To clean the exterior surfaces of the ALPHA MPDX Portable Dental X-Ray System, use a clean cloth that has been moistened, not soaked, in a solution made from clean, fresh water and mild soap.

CAUTIONS

To avoid damage to electrical and electronic components, do not soak any components of the X-Ray System during cleaning.
To avoid damaging lettering, and dulling the finish on exterior surfaces, do not use strong cleaners or solvents.
To avoid scratches on the lens of the LINE VOLTAGE indicator, do not attempt to polish the lens cover.

3-7 STORAGE

CAUTION

Refer to paragraph 5-4, Long Term Storage Procedures for storage durations of longer than six (6) months.

The Dental X-Ray System does not require any special storage facilities. The non-operating (storage) temperature limits are -30°F to +120°F and the humidity limits are 0 to 95% (non-condensing). The system may be stored indoors or outdoors (within the temperature and humidity limits). However, the system should be sealed in the re-usable container during outdoor storage.

SECTION 4

GENERAL THEORY OF OPERATION

4-1 INTRODUCTION

This section provides the functional description of the ALPHA MPDX Portable Dental X-Ray System. Each of the functional blocks is described in its normal operating sequence and will be identified in the ALPHA MPDX Portable Dental X-Ray System, Simplified Block Diagram (Figure 4-1). The overall system simplified functional description is supplemented by a subfunctional description of X-Ray Control Assembly (1A1) provided in paragraph 4-2.1 and the supporting simplified subfunctional block diagram illustrated in Figure 4-2. Each functional subassembly contained in the X-Ray Control Assembly is described in subsequent subparagraphs 4-2.1.1 through 4-2.1.5.

In order to effectively utilize the functional descriptions in this section these descriptions are arranged to match the sequence of the Maintenance/Troubleshooting Instructions provided in Section 5 of this manual.

Detailed schematic diagrams are provided in Section 7 of this manual and are referenced in this section as required to support the level of maintenance recommended in the field.

4-2 SIMPLIFIED FUNCTIONAL DESCRIPTION OF THE ALPHA MPDX PORTABLE DENTAL X-RAY SYSTEM

This paragraph provides a discussion of the functions of the ALPHA MPDX Portable Dental X-Ray System, including the interaction between the two major functional assemblies (X-Ray Control Assembly (1A1) and X-Ray Source Assembly (1A2) that are contained in the X-Ray Unit (Unit 1). Figure 4-1 should be used to identify the major functional elements of the X-Ray System. A schematic diagram of the Control Board Subassembly,1A1A1, (Figure 7-1) is included in Section 7 of this manual, as is a schematic/wiring diagram (drawing 500892) of the X-Ray Unit (Unit 1).

The three major functional assemblies of the ALPHA MPDX X-Ray System are the X-Ray Control Assembly (1A1), which produces the control and operating signals for the X-Ray System; the X-Ray Source Assembly (1A2), which contains the X-ray tube that generates the X-Rays and the Scissor Arm Assembly (1A3), which permits positioning of the X-ray head in all necessary diagnostic positions. All operating controls and indicators are contained in the X-Ray Control Assembly.

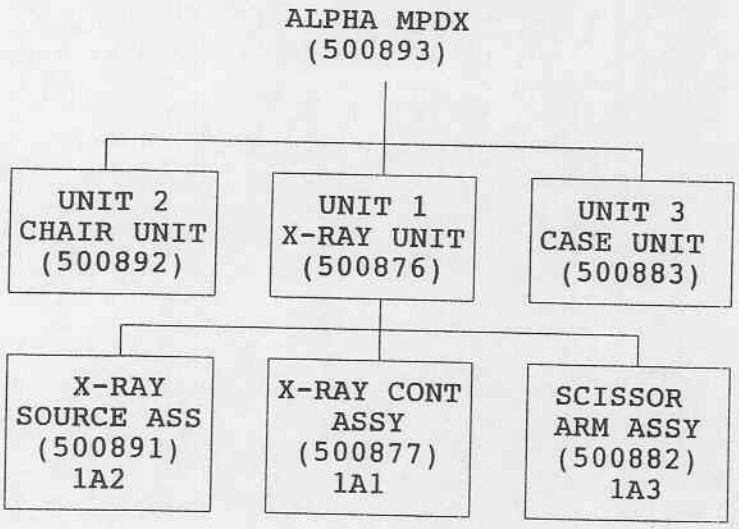


Figure 4-1. ALPHA MPDX Portable Dental X-Ray System, Simplified Block Diagram

4-2.1 X-Ray Control Assembly (1A1), Functional Block Description

As shown in Figure 4-2, line power is applied to Line Filter 1A1LF1, for the purpose of reducing noise in the power line. The noise-filtered line power is then applied to Circuit Breaker/POWER-ON Switch CB1.

When the circuit breaker/POWER ON switch is in the ON position, the green POWER-ON indicator (1A1DS1) illuminates and LINE VOLTAGE panel meter 1A1M1 displays the line voltage reading. The line voltage is then applied to Step-Down Transformer 1A1T1, which provides power to the low voltage circuits, and to Full-Wave Bridge Rectifier 1A1CR1. The rectified (DC) voltage is then routed to Capacitor Board 1A1A6A5, where the DC voltage is filtered and smoothed. The smooth, filtered DC voltage is then routed to Power Switch Module 1A1Q1.

The power switch module contains two isolated-gate, bipolar transistors (IGBTs) that are alternately switched on and off by Control Board Subassembly 1A1A1. The DC voltage is then applied to the primaries of the high-voltage transformers located in each of Anode and Cathode Supply Subassemblies 1A1A8A3 and 1A1A8A4. The anode and cathode supplies generate the ±35kV for the X-Ray Tube.

In order to maintain a constant high-voltage output to the power switch module, the control board (1A1A1) monitors the feedback signal from the cathode supply and modifies the width of the pulses applied to the power switch module. To control the X-Ray tube current, the control board also provides a switched, regulated voltage to the primary of the filament transformer located in cathode supply 1A1A4. Control board timing circuits determine the length of time switching signals are applied, based on the setting of Timing Switch Board 1A1A6A2 and the closure of the X-Ray-On Exposure Switch 1A1S1. X-RAY ON indicator lamp 1A1DS2 and Buzzer 1A1BZ1 provide visual and audible indications of exposure, respectively.

Transformer 1A1T2 provides over-current protectction in the event of a high-voltage arc.

Figure 4-2. X-Ray Control Assembly (1A1), Simplified Functional Block Diagram

4-2.1.1 Control Board Subassembly (1A1A1), Functional Description

The control board has four connectors (J1, J2, J3, J4) that interface with the system, and two connectors (J5, J6) that interface with the automatic test set for troubleshooting the control board. Connector J1 interfaces with: the incoming AC power, the line power voltage meter, the exposure switch, the lamps, and the buzzer. Connector J2 interfaces with the cathode supply (filament drive and feedback) and the over-current transformer. Connector J3 provides drive voltages for the power switch module. Connector J4 interfaces with the timing switch.
Primary power is applied to pins, 5, 7 and 11 of connector J1. The AC voltage can vary between 48 and 96 VAC depending on the value of the incoming power line voltage. Diodes CR1, CR2 and CR3, CR4 form two full-wave rectifiers, and capacitors C1 and C2 provide filtering. Integrated circuit U11 and its associated components form a switching regulator, low-voltage power supply. This supply can be adjusted by potentiometer R12, which provides current adjustment for the X-ray tube.

CAUTION

The 24-volt value noted on the electrical diagrams is only approximate. The actual voltage level of this supply is, whatever voltage is required to produce 7 mA in the X-ray tube. To avoid possible damage to the X-Ray System, do not adjust this supply unless the adjustment is made as part of the mA calibration procedure.

Integrated circuit U12 produces fixed 15-volt power, derived from the 24-volt supply. Integrated circuit U14 produces fixed 5-volt power, derived from the 15-volt supply. Integrated circuit U13 produces a fixed -15 volt power output. Upon turn on, 24 volts is applied to the POWER ON indicator through resistor R20 and pin 3 of connector J1.

Upon depressing (and maintaining pressure on) the X-ray exposure switch, the following sequence occurs:

A ground is applied to pin 4 of connector J1. This negative-going signal triggers timers U1 and U2 and enables gate U4A (U1 is a fixed 3-second timer and U2 is a fixed 1-second timer). Timer U1 turns on the X-ray tube filament by enabling pulse width modulator U8 via inverter U6E and transistor Q4. Pulse width modulator U8 drives transistors Q5 and Q6, which in turn drive the primary of the filament transformer in the cathode supply at approximately 40 kHz. Timer U2 allows the filaments to preheat for one second, then turns on exposure timer chip U3. This timer chip takes BCD timing information from the front panel EXPOSURE TIME switch ,which also selects between timer calibration adjustment potentiometers R19 and R21. Potentiometer R21 adjusts short exposure times and potentiometer R19 adjusts long exposure times.

After being triggered by fixed, 1-second timer U2, exposure timer U3 produces a timed-pulse output to gate U4A, which acts as the "dead man control", in that pressure must be maintained by depressing and holding the exposure switch, in order for the timed pulse to be coupled to pulse-width modulator U7. The pulse width modulator drives the two IGBT's in power switch module 1A1A1Q1 at approximately 40 kHz. A fixed 15-second timer (U5) is triggered at the end of the timed pulse and prevents any additional exposures, while the X-ray tube cools, by disabling gate U4C. Timer U10 is triggered at the same time as pulse-width modulator U7 and drives the X-RAY ON lamp and buzzer for a minimum time, so that they are discernible even in short timer intervals. Reference amplifier U9A provides the

4-2.1.1 Control Board Subassembly (1A1A1), Functional Description (continued)

adjustable reference voltage for the high-voltage supply and inverting amplifier U9C provides the feedback voltage from the cathode supply. These voltages are summed in error amplifier U9D and fed to U7 which varies the pulse widths of the IGBT drive in order to maintain a constant high-voltage output. Timer U15 monitors overcurrent transformer 1A1T2, and stops the exposure in the event of an arc, by resetting exposure timer U3 and stopping pulse-width modulator U7.

4-2.1.2 Timing Switch Board Subassembly (1A1A2), Functional Description

Timing Switch Board Subassembly 1A1A2 provides the mounting for the timer switch.

4-2.1.3 Anode Supply Subassembly (1A1A3), Functional Description

Anode Supply Subassembly 1A1A3 contains a 40 kHz, high-voltage transformer (8.75 kv) and a four-stage multiplier assembly that produces +35 kv constant potential for the X-ray tube anode.

4-2.1.4 Cathode Supply Subassembly (1A1A4), Functional Description

Cathode Supply Subassembly 1A1A4 contains a 40 kHz, high-voltage transformer (8.75 kv) and a four-stage multiplier assembly that produces -35 kv constant potential for the X-ray tube cathode. It also contains a 40 kHz filament transformer and a precision resistive feedback voltage divider.

4-2.1.5 Panel Subassembly (1A1A6), Functional Description

Panel Subassembly 1A1A6 provides the mounting for the front panel components.

4-2.1.6 Exposure Switch Subassembly (1A1A7), Functional Description

Exposure Switch Subassembly 1A1A7 contains a single pole-single-throw momentary action switch, a coil cord that can be extended over six feet, and a male connector. This switch, when depressed and held, initiates and maintains the exposure. Releasing the switch before the end of the exposure will terminate the exposure and reset the timer.

4-2.1.7 Line Filter Board Subassembly (1A1A8), Functional Description

The Line Filter Board Subassembly (1A1A8) provides filtering of the incoming 115VAC line power.

4-2.1.8 X-Ray Control, Harness Subassembly (1A1A9), Functional Description

This harness subassembly contains the wiring/cable bundle for X-Ray Control Assembly 1A1.

4-2.2 X-Ray Source Assembly (1A2), Functional Block Description

The X-Ray Source Assembly (1A2) uses the $\pm$35KV supplied from the Anode Supply Subassembly and from the Cathode Supply Subassembly to generate X-Radiation (see Figure 4-2).

SECTION 5

MAINTENANCE/TROUBLESHOOTING

5-1 INTRODUCTION

This section includes periodic maintenance, testing, troubleshooting, calibration, alignment, adjustment, replacement, and disassembly procedures for the ALPHA MPDX Portable Dental X-Ray System. Maintenance can be performed with general-purpose tools and with special test equipment listed in Table 5-1. If any item listed in Table 5-1 is not available, an equivalent item may be substituted. The X-Ray System is designed to permit the use of standard electronic test equipment whenever possible.
This manual provides maintenance and troubleshooting instructions required for field level maintenance of the X-Ray System. Maintenance, troubleshooting and repair of subassemblies such as printed circuit boards, is beyond the scope of this manual. A Test Program Set (TPS), designed for use with the AN/USM-465A Test Set is provided as a separate item of this contract. For example, the TPS and the AN/USM-465A Test Set are used to provide automated test and troubleshooting of Control Board Subassembly 1A1A1, which is contained in the X-Ray Unit (Unit 1).

Table 5-1. List of Special Tools and Test Equipment Recommended

Nomenclature	Model or Part Number	Manufacturer	Qty
High Pot Test Dv.	HA3-AT-LST	Hipotronics	1
Leakage Test Jig	TF-110	Dynarad	1
Digital Voltmeter /Ammeter	Model 87	Fluke	1
Clamp-On Ammeter	Model 633	Weston	1
Storage Oscillo-scope	Model VC-6020	Hitachi	1
KVP Divider	Model 35080	Keithley	1
Dosimeter	Model 35050	Keithley	1
HVL Test Fixture/ 1.5 mm Filter	TF-111	Dynarad	1
Spanner Wrench	5480A12	McMaster Carr	1

5-2 PERIODIC MAINTENANCE SCHEDULE AND PROCEDURES

The recommended periodic maintenance schedule for the ALPHA MPDX Portable Dental X-Ray System is presented in Table 5-2. The schedule includes inspection, cleaning, and lubrication functions. Detailed preventive maintenance instructions are provided in paragraph 5-3.

Table 5-2. Preventive Maintenance Functions Schedule

Interval	Procedure
Monthly	Clean X-Ray System using procedure provided in paragraph 5-3.2.
3 Months	Visually inspect X-Ray System using procedure provided in paragraph 5-3.1.
6 Months	Perform adjustment, calibration and test procedures provided in paragraph 5-5.

5-3 INSPECTION/TESTING/CLEANING PROCEDURES

The X-ray system inspection procedures and operational acceptance tests are provided in the following paragraphs. These procedures should be performed whenever any component fails to meet the minimum performance parameters presented in Table 3-1.
Inspection, cleaning and lubrication procedures should be performed periodically, in accordance with the Preventive Maintenance Functions Schedule presented in Table 5-2.

5-3.1 Inspection/Check Procedures

The following instructions provide step-by-step inspection/check procedures.

1. Visually inspect the unit. Check cables and electrical connectors for bent, broken, or loose pins, cracked or broken insulators, broken or loose pin connections and dirt and corrosion. Repair any damage as required to restore the unit.
2. Verify that the unit meets all of the pre-operational requirements provided in paragraph 3-3 of this manual.
3. Check all hardware connections for security. Tighten any loose connections.
4. Inspect the unit for chips, scratches or exposed metal. Use touch-up paint to repair any damage to paint or finish.
5. Perform corrective, adjustment or calibration procedures as required to resolve a malfunction, or perform periodic alignment adjustment and calibration functions in accordance with the schedule provided in Table 5-2.

Adjustment and calibration procedures are presented in paragraph 5-5.

5-3.2 Cleaning Procedures

To clean the exterior surfaces of the ALPHA MPDX Portable Dental X-Ray System, use a clean cloth that has been moistened, not soaked, in a solution made from clean, fresh water and mild soap.

CAUTIONS

To avoid damage to electrical and electronic components, do not soak any components of the X-Ray System during cleaning.
To avoid damaging lettering, and dulling the finish on exterior surfaces, do not use strong cleaners or solvents.
To avoid scratches on the lens of the LINE VOLTAGE indicator, do not attempt to polish the lens cover.

To remove accumulated dirt from the interior of the X-Ray System, use low-pressure compressed air.

5-4 LONG TERM STORAGE, MAINTENANCE PROCEDURES

Long term storage maintenance procedures are provided in Table 5-3.

Table 5-3. Long Term Storage, Maintenance Procedures

Number of months	Procedure	Action
6 Months	ALPHA MPDX Portable Dental X-Ray System, X-Ray Tube Degassing.	Follow the Assembly and Setup procedure provided in paragraph 2-4, in Section 2 of this manual Cycle the X-Ray System, starting with the shortest time. Gradually increase the time exposures up to the maximum time settings. Allow the X-ray tube to cool for 2 minutes between exposures.

5-5 ADJUSTMENT,CALIBRATION AND TEST

The X-Ray System is shipped from the factory in a properly aligned and adjusted condition. Adjustment of particular components may be performed as required to address either one of the following situations:

- o To correct an operational malfunction
- o Subsequent to replacement of a critical operational component

WARNING

To avoid injury to inexperienced personnel during performance of alignment, adjustment, test and calibration procedures, only trained and qualified personnel should be permitted access to the interior parts of the X-Ray System, particularly the X-Ray Control Assembly (1A1).

5-5.1 Performance Sequence for Adjustment, Calibration and Test Procedures

Prior to performing the following procedures, make a copy of the Calibration Checklist provided as Figure 5-1 in this section. Record test and calibration results on the checklist copy in the blank spaces on the list. If any test performed does not result in a reading within the required tolerance and that test reading cannot be adjusted to meet the tolerance limit, refer to the related troubleshooting guide table provided under paragraph 5-6 (TROUBLESHOOTING) in this section.

NOTE

Refer to Calibration Checklist, Figure 5-1, for the following procedure.

1) **HI-POT TEST:** Connect the Black lead of the **Hi-Pot** to chassis ground and the **Red** lead of the **Hi-Pot** to the hot side of the AC plug (blk wire). Power On the Hi-Pot and slowly increase the voltage to **1500V**, maintain that voltage for 60 seconds and check for **Leakage** or **Breakdown.** Remove the **Black** lead of the **Hi-Pot** and connect to the common side of the AC plug (wht wire). Repeat the same procedure.

2) **LEAKAGE CURRENT**: Connect a Line Cord between X-Ray Control Assembly 1A1 and output of Leakage Tester. Connect Leakage Tester to 120VAC. Connect DVM and set to 2mA AC range. Set power switch (of tester) to Normal and turn on control. Enter the reading on checklist. Repeat with power switch set to Reverse. If leakage is excessive (more than 100 microamps) alert supervisor. Enter measurements on Checklist.

3) **LINE VOLTAGE METER:** Plug the unit into the source outlet. Connect an AC meter to the same source. Measure and record the voltage on the data sheet. Note the meter reading on the control panel. If the reading is high adjust **1A1A1R54** on Control Board Subassembly 1A1A1, clockwise to decrease the meter reading. If the reading is low adjust **R54** counter-clockwise to decrease the meter reading. Record final reading on Calibration Checklist, Figure 5-1.

4) **MA / KVP CALIBRATION**

a) **Calibration Set-Up**: Load the kVp Divider with the 0 = 42 kVp cassette (filter pack #32867C) and place in the X-Ray field. Connect the KVP divider cable to the oscilloscope and set up as follows:

Volts/Div: .1
Time/Div : 20 mS
Ground Input/trace: lower line
Mode: Channel 1
Pre trigger: 2 divisions

Display: set to Storage
Source: Channel 1
Input: DC
Trigger Mode: Single
Push "Ready"

b) **Line Voltage:** Using a digital voltmeter measure and record the AC line voltages (nominal: 110/60 hZ and 220/50 hZ).

c) **mA Calibration:**
Connect the oscilloscope probe to **mA Test Point** and the ground lead to chassis ground. Turn unit On. Make an exposure and note the measured mA. If the output is high, adjust **1A1A1R12** on Control Board Subassembly 1A1A1 clockwise to decrease. If the output is low, adjust counter-clockwise to increase. **Make another exposure to verify the adjustment and record on Calibration Checklist.**

d) **kVp Calibration:**
Make an exposure and compute the kVp by counting the base line as 42 kVp and each division as 10 kVp. If the kVp output is low, adjust **1A1A1R43** on Control Board Subassembly 1A1A1, clockwise to increase. If the kVp output is high, adjust **1A1A1R43** counter-clockwise to decrease. **Make another exposure to verify the adjustment and record on Calibration Checklist.**

5) **TIMER TEST DATA:** Connect the Dosimeter to probe-chamber and place the chamber in the x-ray field at 40 inches.

a) **Calibration:** Set the Timer Switch to the 2.0 second setting. Make an exposure and measure the time base of the kVp wave form at the 50% level. If the exposure time is long, adjust **1A1A1R19** on Control Board Subassembly 1A1A1, clockwise to decrease. If the exposure time is short, adjust **1A1A1R19** counter-clockwise to increase. **Make another exposure to verify the adjustment.** Set the Timer Switch to the .2 second setting and repeat the same procedure, adjust **1A1A1R21** on Control Board Subassembly 1A1A1, if required.

b) **Verification:** Remove the mAs meter from **TB1-Pin 3 &5.** Measure the time base of the kVp wave form at the 50% level. Confirm timer accuracy as indicated on Calibration Checklist.

6) **EXPOSURE INDICATION**: Confirm audible and visual indication of exposure at the timer settings listed.

7) **LINE CURRENT:** Attach the Ammeter Clamp over the black wire of the line cord and connect leads to AC Ammeter on 200 mA scale. Make a 1.0 second. exposure. If meter reading is within tolerance, record on Calibration Checklist.

8) **HALF VALUE LAYER:** Connect Dosimeter to probe-chamber and place chamber in the x-ray field at 40 inches. Connect DC Voltmeter (2 v. scale) to binding posts, set mode to Dose and turn Dosimeter on. Momentarily pressing Zero should set voltage on meter to 0, + or - .003 volts. If voltage drifts try turning on Background and adjust cw if drifting down, ccw if drifting up.
Set the following technique factors; 70 kVp, 7 mA and 1/10 second. Place the Half Value Layer Test Tool in the test chamber without the filter in place. Make an exposure, multiply DC volts by 100 (for mR), and enter as the Unfiltered Reading.
Place the 1.5 mm filter over the opening in the Test Tool, make an exposure and record mR as Filtered Reading. Divide the Filtered Reading by the Unfiltered Reading and enter on Calibration Checklist. Result must be greater than 0.51.

9) **REPRODUCIBILITY:**
Set the following technique factors; 70 kVp, 7 mA and 1/10 second. Make an exposure and read the resulting DC voltage from the Dosimeter. Multiply this figure by 100 (move decimal point 2 places right) and enter on Calibration Checklist as mR. Repeat for a total of ten exposures. Using a statistics program calculator, compute mean (X) and standard deviation (s). Compute coefficient of variation by dividing standard deviation by the mean (as shown on Calibration Checklist). If unit is within tolerance, enter these values on Calibration Checklist.

10) **LEAKAGE TEST:** Set the following technique factors; 70 kVp, 7 mA and 1.0 second. Place the ion chamber of the Dosimeter on the bottom shelf (40" SID) make an exposure and record the mR reading. Rotate the unit so an exposure is made from all six sides. Record all mR readings as position 1 through position 5 on Calibration Checklist. Multiply all mR readings by 60 and verify that no reading exceeds 50 mR.
If any reading exceeds 50 mR, notify the supervisor.

11) **BEAM LIMITING DEVICE:**: Place identifying numbers (stock or serial) on upper right corner of the cassette. Position the cone so that it is resting squarely on the cassette. Make an exposure at .06 seconds. Develop the film and inspect image. Measure the actual x-ray field and record the numbers on the Calibration Checklist.

12) **FINAL STEP:** Verify that the entire Calibration Checklist has been completed. Sign and date the Calibration Checklist. Deliver finished unit and Calibration Checklist to the QC bench and notify supervisor.

1) **HI-POT TEST** (1500 VAC for 1 Min.)

Hot leg to ground _____, Common leg to ground _____

2) **LEAKAGE CURRENT** (100 micro amps maximum)

Normal _____ Reversed _____

3) **LINE VOLTAGE METER** (measure & record)

Source Voltage _____ VAC, Meter Reading _____ VAC (+/- 4% of source)

4) **MA / KVP CALIBRATION** (1/10 seconds)

Nominal Line Voltage: 110VAC/60HZ, **Actual:** _____ VAC/60HZ

Nominal kVp	Tolerance	Actual	Nominal mA	Tolerance	Actual
70	64.4 - 75.6	_____	7	6.44 - 7.56	_____

Nominal Line Voltage: 220VAC/50HZ, **Actual:** _____ VAC/50HZ

Nominal kVp	Tolerance	Actual	Nominal mA	Tolerance	Actual
70	64.4 - 75.6	_____	7	6.44 - 7.56	_____

5) **TIMER TEST DATA** (measured in milliseconds)

Nominal	Spec.	Actual	Nominal	Spec.	Actual
0.012	8 - 16	____	0.50	457 - 543	____
0.07	61 - 79	_____	1.00	917 - 1083	____
0.12	108 -132	_____	2.00	1837 - 2163	____

6) **INDICATION OF EXPOSURE** (**Audible and Visual** at all settings from 0.02 sec. through 2.0 sec.)

_____

7) **LINE CURRENT** (Less than 7 Amps)

70 kVp @ 7 mA 110 VAC Line Voltage = ___ amps

8) **HALF VALUE LAYER** (@ 70 kVp, 7 mA, 0.5 sec. @ 40 in.)

Filtered Reading (1.5 mm) = _____
Unfiltered Reading = _____ = _____ (greater than 0.51)

Figure 5-1. Calibration Checklist (Sheet 1 of 2)

9) **REPRODUCIBILTY** (70 kVp, 7 mA, 0.10 sec. @ 40 in.)

Exp. No.	mR	Exp. No.	mR
1	_____	6	_____
2	_____	7	_____
3	_____	8	_____
4	_____	9	_____
5	_____	10	_____

Standard Deviation (s) =_____

---------- = _____ (less than .02)

Average of 10 exposures =_____

10) **LEAKAGE TEST** (@ 70 kVp, 7 mA, 1 sec. @ 40")
Tolerance: less than 50 mR/hour

Position	mR Reading		mR/hour
1)	_____ mR	X 60 =	_____
2)	_____ mR	X 60 =	_____
3)	_____ mR	X 60 =	_____
4)	_____ mR	X 60 =	_____
5)	_____ mR	X 60 =	_____
6)	_____ mR	X 60 =	_____

11) **BEAM LIMITING DEVICE** (Field size @ 20 cm. SSD)

Field Size: _____cm Diameter (Tolerance: 5.8 - 6.2 cm)

** ATTACH TEST FILM TO CALIBRATION SHEET **

CALIBRATED BY:_____ **DATE:**_____

INSPECTED BY:_____ **DATE:**_____

Figure 5-1 Calibration Checklist (Sheet 2 of 2)

5-5.2 Procedure for Adjusting the Friction Between the Tube Housing Assembly and the Yoke, in X-Ray Source Assembly 1A2

If the rotation of the Tube Housing Assembly (500898) within the Yoke (102881) appears too tight, or too loose, refer to drawing 500891 in Section 7 of this manual and perform the following procedure:

Step 1. Remove the flat-head screw (381576) from the center of the anchor nut (102817).

Step 2. Insert a spanner wrench into the two holes in the anchor nut. Turn the nut clockwise to tighten the tube housing rotation and counterclockwise to loosen the rotation of the tube housing.

Step 3. Replace the flat-head screw.

5-5.3 Procedure for Adjusting the Friction Between X-Ray Source Assembly 1A2 and Scissor Arm Assembly 1A3

If the rotation of the X-Ray Source Assembly to the Scissor Arm Assembly appears to be too tight or too loose, refer to drawing 500882 in Section 7 of this manual, and perform the following procedure:

To tighten the rotation of the X-Ray Source Assembly, insert a 5/64 allen wrench into the setscrew (381570) and turn the setscrew clockwise. To loosen the the rotation of the X-Ray Source Assembly, turn the setscrew counterclockwise.

5-5.4 Procedure for Adjusting the Vertical Motion of Scissor Arm Assembly 1A3.

If the scissor arm drifts up or down, perform the following procedure:

Step 1. Remove the small plastic block on the underside of the adjustable arm.

Step 2. Slide off the plastic strip.

Step 3. Use a flat-blade screwdriver to rotate the tension nut, clockwise to increase the tension and counter clockwise to decrease the tension. This adjustment should be performed in small increments until the proper counterbalance is obtained.

5-6 TROUBLESHOOTING

Troubleshooting procedures for the ALPHA MPDX Portable Dental X-Ray System are presented in Table 5-4, System Troubleshooting Guide.

The System Troubleshooting Guide includes troubleshooting procedures that isolate the system fault to either a replaceable assembly or component. Prior to performing the troubleshooting procedures provided in Table 5-4, the servicing technician should verify that the X-Ray System is properly adjusted and calibrated in accordance with the procedures provided in paragraph 5-5 in this section.

References is made to the following figure and tables:

Figure 5-1. Calibration Checklist
Table 5-4. System Troubleshooting Guide

NOTE

Troubleshooting of Control Board Subassembly 1A1A1 in the X-Ray Unit is performed with the AN/USM-465A Test Set. A specific Test Program Set (TPS) for testing and troubleshooting subassembly 1A1A1 with the Test Set is supplied as a separate item of this contract. The TPS instructions are provided in a supplementary manual.

The System Troubleshooting Guide ,Table 5-4, presents troubleshooting procedures for the overall X-Ray System. After the probable cause of the malfunction has been isolated, the maintenance technician is referred to the corrective action required to remedy the malfunction.

NOTE

Prior to performing the procedures provided in Table 5-4, the servicing technician should verify the security of all electrical connections and mechanical fittings.

Table 5-4. System Troubleshooting Guide

Malfunction	Probable cause	Corrective action
POWER ON light does not illuminate	1) Defective lamp	1) Replace lamp 1A1DS1 (370094). (See drawing no. 500900 in Section 7 of this manual.)
	2) No 24 volt power to lamp	2) Check low-voltage power supply integrated circuit chip U11 (330034) on Control Board Subassembly 1A1A1. (See drawing no. 500878 in Section 7 of this manual.) Replace integrated circuit chip U11 if defective.
	3) Defective POWER ON switch	3) Replace POWER ON switch 1A1CB1 (378083). (See drawing no. 500900 in Section 7 of this manual.)
Buzzer does not sound when X-Rays are being generated	1) Defective Buzzer	1) Replace Buzzer 1A1BZ1 (205006). (See drawing no. 500900 in Section 7 of this manual.)
X-Ray indicator does not illuminate when X-Rays are being generated	1) Defective indicator lamp	1) Replace lamp 1A1DS2 (370093). (See drawing no. 500900 in Section 7 of this manual.)
No exposure is produced when the Exposure Switch is depressed	1) Defective Exposure Switch Subassembly	1) Replace Exposure Switch Subassembly 1A1A7 (500902). (See drawing no. 500877 in Section 7 of this manual.)
	2) Defective Control Board Subassembly	2) Replace Control Board Subassembly 1A1A1 (500878). (See drawing no. 500900 in Section 7 of this manual.)
When X-Ray System is powered up, POWER ON circuit breaker trips	1) Defective Power Switch Module Transistor	1) Replace Power Switch Module Transistor 1A1A1Q1 (310016) on Control Board Subassembly 1A1A1. (See drawing no. 500878 in Section 7 of this manual.)
	2) Defective Rectifier Diode	2) Replace Rectifier Diode 1A1A1CR1 (300002) on Control Board Subassembly 1A1A1. (See darwing no. 500878 in Section 7 of this manual.)
	3) Defective Capacitor Board Subassembly	3) Replace Capacitor Board Subassembly 1A1A5 (500920). (See drawing no. 500900 in Section 7 of this manual.)

Table 5-4. System Troubleshooting Guide (Continued)

Malfunction	Probable cause	Corrective action
Intermittent, Short Exposures	1) High voltage arcing.	1a) Replace Anode Supply Subassembly 1A1A3 (500879). (See drawing no. 500901 in Section 7 of this manual.) 1b) Replace Cathode Suppply Subassembly 1A1A4 (500880). (See drawing no. 500901 in Section 7 of this manual.)
	2) Gassy X-Ray Tube	2) Replace Tube Housing Assembly and associated cables (500898). Refer to procedure provided in paragraph 5-7.2.1 in this Section. (See drawings 500876, 500879 and 500891 in Section 7 of this manual.)
Exposure does not terminate	1) Defective Control Board Subassembly	1) Replace Control Board Subassembly 1A1A1 (500878). (See drawing no. 500900 in Section 7 of this manual.)
	2) Defective Timer Switch Board Subassembly	2) Replace Timer Switch Board Subassembly 1A1A2 (500921). (See drawing no. 500900 in Section 7 of this manual.)

5-7 REMOVAL, REPLACEMENT, DISASSEMBLY AND REPAIR PROCEDURES

This paragraph provides removal, replacement, disassembly and repair procedures. Subsequent paragraphs provide instructions for parts replacement. The instructions are limited to those parts/assemblies for which replacement procedures are not obvious. To locate a part/assembly location drawing, refer to Section 7 in this manaual. Where disassembly is required, a disassembly procedure is provided herein. Where required, the associated parts location diagram in Section 7 is referenced to support the disassembly procedure. In those instances where parts replacement is not the reverse of the removal procedure, specific replacement procedures are included.

5-7.1 Removal Procedures.

Removal procedures for specific assemblies requiring special or unique procedures are included in the Replacement Procedure for that assembly.

5-7.2 Replacement Procedures.

This paragraph provides replacement procedures for those components that require specific replacement instructions. These procedures include the necessary removal procedures.

5-7.2.1 Procedure for Replacing the Tube Housing Assembly

NOTE

Refer to drawings 500876, 500877 and 500891 in Section 7 of this manual, when performing this procedure.

To remove the defective Tube Housing Assembly proceed as follows:

Step 1. Disconnect the line cord, dental cone, and exposure switch and place the X-Ray Assembly (500876) on a work bench or table.

Step 2. To remove the control cover (102888), remove eight (8) screws (380548) and one (1) screw (380536).

Step 3. Remove the six (6) screws (381009) from the rear panel and separate the front panel (500900) and rear panel (500901).

Step 4. Disconnect the three (3) H.V. connectors (384307) from the anode supply (500879) and cathode supply (500800), by twisting each connector and pulling out, also disconnect green wire from TB1 (5).

Step 5. To remove the limits block (102964) from the back of the rear plate assembly (500901), remove the two (2) socket head screws (381007).

Step 6. Separate the arm assembly (500882) from the control assembly (800887) by feeding the three high-voltage wires up through the hole in the rear panel and pulling the assemblies apart. Set the control assembly and its loose parts aside.

Step 7. Remove the three (3) H.V. connectors (385307) and all shrink sleeving from the H.V. cables by cutting the cables and unsoldering the connectors.

Step 8. Remove the plastic end cap from the end of the fixed arm by unfastening the retaining screw. Remove the C ring on the pivot post and pull the two arms apart. Feed the three (3) H.V. cables through the fixed arm and place the fixed arm aside.

NOTE

Maintain the alignment of the rotation stop rings relative to the adjustable arm by taping the stop rings to the adjustable arm before separating the two arms.

5-7.2.1 Procedure for Replacing the Tube Housing Assembly (Continued)

Step 9. Remove the plastic block on the underside of the adjustable arm, by unfastening the two (2) screws, and slide the plastic shield out.

Step 10. Remove the three (3) flat head screws (381009) that hold the yoke (102881) to the arm. Pull the assemblies apart and place the adjustable arm aside.

NOTE

A specific Spanner wrench (McMaster Carr 5480A12) is required to remove the outer cap anchor nut (102817).

Step 11. Remove the outer cap (102821) from the yoke by removing the flat head screw (381576), the anchor nut (102817), the disc pad (102820) and the two (2) set screws (381035). Pull the cables through the yoke and set the yoke aside.

Step 12. Remove the cap, yoke end and the shield disc (102809) by unfastening the four (4) set screws (381064). Remove the end cap (102797) by unfastening the four (4) set screws (381063). Remove the port housing (102796) by unfastening the two (2) socket head screws.

To install the replacement Tube Housing Assembly, reverse the removal procedure described above as follows:

Step 1. Reinstall end cap (102797) and shield disc (102805) using the four (4) set screws (381063). Align the holes in the end cap with those in the tube housing. Reinstall the port housing (102796) with the two (2) socket head screws.

Step 2. Pass the three (3) high voltage cables through the hole in the shield disc (102809) and the hole in the yolk end cap and attach the yolk end cap by using the four (4) set screws (381064).

Step 3. Feed the H.V. cables up through the center of the yoke and slip the yoke onto the yoke end cap.

NOTE

The cables should be formed into a loop around the center post of the yoke end cap, as shown in Detail A of drawing 500891, and the parts should be oriented as shown in the drawing.

Step 4. Install the outer cap (102821) and two (2) set screws in the yoke.

Step 5. Install the disc pad (102820) and the anchor nut (102817). Adjust the tension on the anchor nut until the tube housing rotates comfortably in the yoke without drooping. Install the flat head screw (381576) to lock this adjustment in place.

Step 6. Continue to feed the H.V. cable through the adjustable and fixed arms in reverse of the disassembly procedures.

5-7.2.1 Procedure for Replacing the Tube Housing Assembly (Continued)

Step 7. Using the following procedure to reconnect the H.V. connectors:

CAUTION

Two of the three high voltage leads are the x-ray tube filament leads which have continuity between them. These leads should be connected to the Cathode Supply. The third lead is connected to the Anode Supply. Crossing these leads could place high voltage across the filaments which would permanently damage the x-ray tube.

a) Slide three (3) pieces of 2.5-inch shrink tubing (415026) and one (1) piece of 6-inch shrink tubing (415041) onto each H.V. cable (the shrink tubing is included with the replacement tube housing assembly).

b) Push the H.V. cable into the H.V. connector until the inner conductor protrudes from the tip. Solder in place using a minimum of solder and trim.

c) Slide one of the 2.5-inch pieces of shrink tubing down over the narrow end of the connector. Apply heat with a gun until the tubing shrinks to a tight fit around the cable and connector.

d) Repeat Step c for each of the remaining 2.5-inch pieces, one at a time, and repeat the complete process for the 6-inch shrink tubing.

5-7-3 Disassembly Procedures

Disassembly procedures for those items that require specific disassembly instructions are included in the Replacement Procedure for that assembly.

SECTION 6

PARTS CATALOG

6-1 INTRODUCTION

This section lists the component parts of the ALPHA MPDX Portable Dental X-Ray System, manufactured by Dynarad, Inc. The following paragraphs provide a brief description of the lists contained in this section and instructions for requisitioning parts.

6-2 LIST OF MANUFACTURERS

This list contains the Commercial and Government Entity Code (CAGE) which are listed numerically by code number.

6-3 LIST OF MAJOR ASSEMBLIES

This list indicates each major assembly which comprise the complete X-Ray system, together with the assigned reference designation series for the major assembly. In addition, the item number for each major assembly is listed for cross-reference to the Major Assembly Parts List (MAPL) and numerical parts list. This list is in item number order.

6-4 MAJOR ASSEMBLY PARTS LIST

This list contains a complete breakdown of the X-Ray system in top down breakdown order (reference designator sequence is followed where feasible). Major assemblies are broken down into assemblies, subassemblies and components, with each item having an indenture number to show its relationship to the next higher assembly. The information provided in each of the columns of the MAPL is as follows:

6-5 COLUMN 1 - ITEM NUMBER

This column contains consecutive item numbers for each item listed.

6-6 COLUMN 2 - REFERENCE DESIGNATION OR FIGURE AND INDEX NUMBER

This column contains the reference designation appearing on drawings and schematics. For items without a reference designation, the figure and index number for the illustrated part in the handbook is used.

6-7 COLUMN 3 - INDENTURE NUMBER

The indenture number indicates the relationship to the next higher assembly for the item listed.

6-8 COLUMN 4 - PART NAME AND DESCRIPTION

The noun name, modifier, and basic characteristics for each part is provided in this column.

6-9 COLUMN 5 - MANUFACTURER'S CODE

The CAGE for the manufacturer of the part is in accordance with Cataloging Handbook H4-1.

6-10 COLUMN 6 - PART NUMBERS

The Government Standard Number, commercial catalog number, or the manufacturer's part number is listed on the upper line. The second line contains the Dynarad part number. In each case, the upper part number, except for Government Standard Numbers, is that of the actual manufacturer who supplies the part to the contractor. If a part is modified by, or manufactured by, the prime contractor, the prime contractor's part/drawing number is listed in both the upper and the lower lines.

6-11 COLUMN 7 - QUANTITY PER ASSEMBLY

This column indicates the number of parts in the next higher assembly.

6-12 COLUMN 8 - SECTION VII DRAWING

This column refers to the SECTION VII, next higher assembly drawing, for part location.

6-13 NUMERICAL PARTS LIST

This list contains all maintenance significant parts in numeric-alpha sequence by part number and indicates the manufacturer's 5-digit CAGE code, item number, National Stock Number (NSN), and quantity per X-Ray system. The information provided in each of the columns of the Numerical Parts List is as follows:

6-14 PART NUMBER

The part number in this column is the number entered in column 6 of the MAPL.

6-15 THE MANUFACTURER'S CAGE CODE

The manufacturer's code is the same CAGE code that is used in column 5 of the MAPL.

6-16 ITEM NUMBER

The item number of the item's first appearance in the Major Assembly Parts List is entered in this column.

6-17 NATIONAL STOCK NUMBER

The National Stock Number (NSN) is entered, when available.

6-18 QUANTITY PER X-RAY SYSTEM

For each item within the X-Ray system, the total quantity used throughout the complete X-Ray system is entered.

6-19 REFERENCE DESIGNATION LIST

This is an alphanumeric list of reference designations or figure and index numbers that appear on drawings, schematics, or figures. The part numbers and item numbers associated with these reference designations and figures are included as part of this list.

6-20 HOW TO USE THE PARTS CATALOG

a. When the Reference Designation or Figure and Index Number is known, refer to the Reference Designation List for the Part Number and Index Number. Use the item number in the MAPL to obtain the part name, description, and CAGE.

b. When the Major Assembly Title is known, refer to the List of Major Assemblies to determine the Item Number. Use this item number to obtain the description and CAGE in the MAPL.

c. When only the part number is known, refer to the Numerical Parts List for its first appearance and note the item number. Use this item number in the MAPL to obtain the reference designation, description, and CAGE.

Table 6-1. List of Manufacturers

CAGE	MANUFACTURER'S NAME	MANUFACTURER'S ADDRESS
01884	SPRAGUE	1221 N. HIGHWAY LONGWOOD, FL 32750
04713	MOTOROLA INC. SEMICONDUCTOR PRODUCTS DIV.	5005 E. MCDONALD RD. PHOENIX, AZ 85008
06229	ELECTROVERT	466 MAIN ST NEW ROCHELLE, NY 10801
06383	PANDUIT CORP.	17301 RIDGELAND AVE. TINLEY PARK, IL 60477-0981
06776	ROBERTSON NUGENT INC.	800 EAST EIGHTH ST. P.O. BOX 1208 NEW ALBANY, IN 47150
07793	CORCOM INC.	1200 W. FRANCESCO ST. TORRANCE, CA 90502
07858	ARROW HART	2478 FLETCHER DR. LOS ANGELES, CA 90039
087M7	GI SUPPLY CO. INC.	7817 WOODDALE WAY CITRUS HEIGHTS, CA 95611
0K2J7	ASSMANN ELECTRONICS	7402 W. DETROIT ST., SUITE 140 CHANDLER, AZ 85220
1BR23	CW INDUSTRIES	130 JAMES WAY SOUTHHAMPTON, PA 18966
1ES66	MAXIM INTEGRATED PRODUCTS INC.	120 SAN GABRIEL DR. SUNNYVALE, CA 94086
21649	OTTO ENGINEERING INC. OTTO CONTROLS DIV.	2 E. MAIN ST CARPENTERSVILL, IL 60110
25894	DIGI-KEY CORPORATION	P.O. BOX 250 THIEF RIVER FALLS, MN 56701
27264	MOLEX	222-T WELLINGTON CT. LISLE, IL 60532
2G788	TIFFIN MANUFACTURING	90 OSER AVE. HAUPPAUGE, NY 11788
2V082	HEYCO MOLDED PRODUCTS	P.O. BOX 160 KENILWORTH, NJ 07033-1721
37942	MALLORY CAPACITOR CORP. SUB. OF EMHART IND. INC.	3029 EAST WASHINGTON ST. INDIANAPOLIS, IN 46206
3A054	MCMASTER-CARR SUPPLY CO.	9630 NORWALK BLVD. SANTA FE SPRINGS, CA 90670-2932
3G591	SILICONIX INC.	331 CORNELIS ST. PLATTSBURGH, NY 12901

Table 6-1. List of Manufacturers (Continued)

CAGE	MANUFACTURER'S NAME	MANUFACTURER'S ADDRESS
41415	ACCULEX	440 MYLES STANDISH BLVD. TAUTON, MA 02780
44655	OHMITE MFG. CO.	3601 W. HOWARD ST. SKOKIE, IL 60076-4014
46576	PERKO	16490 NW 13TH AVENUE TAUTON, MA 02780
4L042	SILICON GENERAL	11861 WESTERN AVENUE GARDEN GROVE, CA 92641
4R685	NATIONAL SEMICONDUCTOR	SUNNYVALE, CA 94086 MIAMI, FL 33164
50509	DIELECTRIC SCIENCES	88 TURNPIKE RD LOS ANGELES, CA 90039
52179	AUTAC INC.	2180 FOXON RD. N. BRADFORD, CT 06471-0306
53909	CAROL CABLE CO INC.	249 ROOSEVELT AVE PAWTUCKET, RI 02862
56737	PRODUCTION INDUSTRIES	240 TELLER ST. CORONA, CA 91719
57362	DYNARAD	19 JEFRYN BLVD., WEST DEER PARK, NY 11729
57922	BOURNS	1200 COLUMBIA AVE. RIVERSIDE, CA 92507
5F837	SDP INC.	13848 VENTURA BLVD. SUITE D SHERMAN OAKS, CA 91423 CHELNISFORD, MA 01824
5R353	GENERAL ELECTRIC CO. COMPONENTS SALES DEPARTMENT	1635 BORADWAY P.O. BOX 2204 FT. WAYNE, IN 46801
72619	DIALIGHT DIVISION	203 HARRISON PLACE BROOKLYN, NY 11237
74545	HUBBELL HARVEY INC.	584 DERBY MILFORD RD. BRIDGEPORT, CT 06605
76854	OAK GRISBY INC.	88 N. DUGAN RD SUGAR GROVE, IL 60554
77342	AMF INC. (CUN0) POTTER & BRUMFIELD DIV.	200 RICHLAND CREEK DRIVE PRINCETON, IN 77670
7T184	NTE ELECTRONICS INC.	44 FARRAND ST BLOOMFEILD, NJ 07003
7U156	TEXAS INSTRUMENTS SUPPLY DIV.	1001 E. CAMBELL ST. RICHARDSON, TX 75081-1821

Table 6-1. List of Manufacturers (Continued)

CAGE	MANUFACTURER'S NAME	MANUFACTURER'S ADDRESS
80353	CLAROSTAT MFG. CO. INC.	LOWER WASHINGTON ST. DOVER, NH 03820
82104	STANDARD GRIGSBY	920 RATHBONE AVE. AURORIA, IL 60507
82389	SWITCHCRAFT	5555 N. ELSTON AVENUE CHICAGO, IL 60630
84048	VERNITRON	300 MARCUS BLVD. DEER PARK, NY 11729
86797	ROGAN CORP.	3455 WOODHEAD DR. NORTHBROOK, IL 60062-1812
88342	BRYANT ELECTRIC DIVISION OF WESTINGHOUSE	BRIDGEPORT, CT 06606
91984	MAIDA DEVELOPMENT	203 LIBBY HAMPTON, VA 23663
91637	DALE	2064-T 12TH AVE, BOX 609 COLUMBUS, NE 68601
95598	PHILMORE MFG.	40 INIP DR. INWOOD, LI, NY 11696
9Y535	INTERNATIONAL RECTIFIER	233-T KANSAS ST. EL SEGUNDO, CA 90245

Table 6-2. List of Major Assemblies

MAJOR ASSEMBLY DESCRIPTION	IND	REFERENCE DESIGNATION	ITEM NO.
X-RAY ASSY ALPHA III	2	1	2
CONTROL ASSY, FINAL	3	1A1	3
SOURCE ASSY, X-RAY	3	1A2	185
ARM ASSY, SCISSOR	3	1A3	173
CHAIR ASSY, DENTAL	2	2	208
CASE ASSY, DENTAL X-RAY SYSTEM	2	3	256

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
1		1	ALPHA MPDX ASSY, FINAL	57362	500893	1	
2	1	2	X-RAY ASSY ALPHA	57362	500876	1	500876
3	1A1	3	CONTROL ASSY, FINAL	57362	500877	1	500876
4	1A1W1	4	LINE CORD ASSY, 9150/60 (16/3)	57362	500139	1	500877
5		5	CONNECTOR, AC RECPTACLE	88342	7484NC 385013	1	500877
6		5	CONNECTOR, AC PLUG	07858	8115VW 385027	1	500877
7		5	CABLE, SJO 16/3 BLACK	53909	SJO-1342 400012	15	500877
8		4	HARNESS ASSY, CONTROL	57362	500890	1	500877
9	1A1A6	4	PANEL ASSY, CONTROL	57362	500900	1	500877
10	1A1A6A1	5	PC BD ASSY, CONTROL	57362	500878	1	500900
11		6	PC BD,CONTROL (BLANK)	57362	102932	1	500878
12		6	HEATSINK		577202B00000 218107	3	500878
13	1A1A6A1CR20-21,23,39	6	DIODE	04713	1N4148 300001	4	500878
14	1A1A6A1CR1-4,CR16-18 CR30	6	DIODE	04713	1N4005 300002	8	500878
15	1A1A6A1CR7-15, CR24-27,CR34-37	6	RECTIFIER	9Y535	306018 306018	17	500878

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
16	1A1A6A1CR30-31	6	DIODE, ZENER, 12V	04713	1N4742A 303012	2	500878
17	1A1A6A1CR22	6	DIODE, ZENER, 6.2V	04713	1N 823 303018	1	500878
18	1A1A6A1CR32-33	6	DIODE, ZENER, 68V, 5W	04713	1N5373 303019	2	500878
19	1A1A6A1CR5-6	6	DIODE, ZENER, 30V, 5W	04713	IN5363A 303030	2	500878
20	1A1A6A1CR19	6	DIODE, ZENER, 18V, 1W	04713	IN4746A 303034	1	500878
21	1A1A6A1Q3-4	6	TRANSISTOR, FET	3G591	VN10KM 310013	2	500878
22	1A1A6A1Q1,Q5-6	6	TRANSISTOR, HEXFET	9Y535	IRF630 310016	3	500878
23	1A1A6A1Q2	6	TRANSISTOR, PNP	04713	2N2222A 310018	1	500878
24	1A1A6A1U1-2,U5,U10, U15	6	IC, LINEAR	4R685	NE555V 330001	5	500878
25	1A1A6A1U14	6	REGULATOR, VOLTAGE, +5VDC	04713	MC7805C 330009	1	500878
26	1A1A6A1U9	6	IC, QUAD AMP.	4R685	LF347 330028	1	500878
27	1A1A6A1U12	6	REGULATOR, +15V	4R685	LM340T-15 330032	1	500878
28	1A1A6A1U13	6	REGULATOR, -15V	4R685	LM320T-15 330033	1	500878
29	1A1A6A1U7-8,U11	6	IC, PULSE WIDTH MODULATOR	4L042	SG3525A 330034	3	500878
30	1A1A6A1U3	6	IC, DIGITAL	1E566	ICM7260JE 335001	1	500878

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
31	1A1A6A1U4	6	I.C.DIGITAL NAND GATE	4R685	CD4011C(N)OR(E) 335070	1	500878
32	1A1A6A1U6	6	HEX BUFFER, INVERTING	4R685	MC14049UBCP 335071	1	500878
33	1A1A6A1R10,R24,R38, R56-57,R63,R41	6	RESISTOR, 10K 1/4W 5%	44655	OK1035 340001	8	500878
34	1A1A6A1R25	6	RESISTOR, CARB. 1.2M, 1/4W 5%	91637	RCR07FG125J 340006	1	500878
35	1A1A6A1R6,R14-15,R22 R26,R29-33,R48,60-61	6	RESISTOR, 1K 1/4W 5%	44655	OK1025 340014	13	500878
36	1A1A6A1R9,R62	6	RESISTOR, 47K 1/4W 5%	44655	OK4735 340025	2	500878
37	1A1A6A1R58,R64	6	RESISTOR, 100 OHM 1/4W 5%	44655	OK1015 340029	2	500878
38	1A1A6A1R27,R37	6	RESISTOR, 100K 1/4W 5%	44655	OK1045 340035	2	500878
39	1A1A6A1R4	6	RESISTOR, 220 OHM 1/4W 5%	44655	OK2215 340045	1	500878
40	1A1A6A1R23,R47	6	RESISTOR, 4.7K 1/4W	91637	RCR07G472JS 340060	2	500878
41	1A1A6A1R46	6	RESISTOR, 200K 1/4W	91637	RC07G204K 340063	1	500878
42	1A1A6A1R49	6	RESISTOR, 470 OHM 1/4W	91637	RCR07GF471J 340065	1	500878
43	1A1A6A1R17	6	RESISTOR, 1%, 90.9K, 1/4W	91637	RN55C9092FJ 340128	1	500878
44	1A1A6A1R68-69	6	RESISTOR, 100 OHM 1/2W	91637	RCR20G101JM 340132	2	500878
45	1A1A6A1R13,R42,R45	6	RESISTOR, 10K 1/4W 1%	91637	RN55C1002K 340152	3	500878

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
46	1A1A6A1R51-52	6	RESISTOR,CARB.COMP,51 OHM,1/2W	91637	RC20G510KS 340159	2	500878
47	1A1A6A1R8	6	RESISTOR, 75 OHM, 1/4W	37942	CCR250J750 340170	1	500878
48	1A1A6A1R11	6	RESISTOR, PREC 25.5K, 1/8W, 1%	91637	RNC55H2552FS 340208	1	500878
49	1A1A6A1R34-35	6	RESISTOR, CARB,680 OHM,1/4W,5%	91637	RC07G681KS 340198	2	500878
50	1A1A6A1R5	6	RESIST0R, CARBON, 18K OHM 1/4W	44655	RC07G183K 340214	1	500878
51	1A1A6A1R16	6	RESISTOR, CARBON 270K 1/4W 5%	91637	RCR07GF274 340216	1	500878
52	1A1A6A1R50	6	RESISTOR, M.F. 3.83K OHM, 1/8W	91637	RN55C3831F 340234	1	500878
53	1A1A6A1R7,R31	6	RESISTOR, 3.4K 1/8W 1%	91637	RNC55H3401FS 340277	2	500878
54	1A1A6A1R65-66	6	RESISTOR, CARB. 10 OHM 2W 5%	91637	RC42G100KS 340280	2	500878
55	1A1A6A1R3,R59	6	RESISTOR, CARB. 51 OHM 1/4W 5%	91637	RC07G510KS 340281	2	500878
56	1A1A6A1R36	6	RESISTOR, PREC. 105 KOHM 1/8W 1%	91637	RN55C1053F 340283	2	500878
57	1A1A6A1R53	6	RESISTOR, PREC 255 KOHM 1/8W 1%	91637	RN55C2553F 340285	1	500878
58	1A1A6A1R55	6	RESISTOR, PREC 100 OHM 1/8W 1%	91637	RN55C1000F 340286	1	500878
59	1A1A6A1R18	6	RESISTOR, PREC 150K, 1% 1/8W	91637	RN55C1503F 340299	1	500878
60	1A1A6A1R20	6	RESISTOR, PREC 37.4K 1/8W, 1%	91637	RN55C3742FJ 340301	1	500878

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
61	1A1A6A1R28	6	RESISTOR, 1.5K, 1W, 5%	91637	RCR07GF152J 340302	1	500878
62	1A1A6A1R67	6	RESISTOR, PREC. 140 OHM 1/8W 5%	91637	RN55C1400F 340307	1	500878
63	1A1A6A1R39-40	6	RESISTOR, 47 OHM 1/4W, 5%	91637	RC07G470K 340304	2	500878
64	1A1A6A1R19,R54	6	POTENTIOMETER, TRIM, 100K	57922	3292X-1-104 345068	2	500878
65	1A1A6A1R43	6	POTENTIOMETER, TRIM, 10K	57922	3292X-1-103 345069	1	500878
66	1A1A6A1R12,R21	6	POTENTIOMETER, TRIM, 25K	57922	3292X-1-253 345070	2	500878
67	1A1A6A1C24,C39	6	CAPACITOR, MONO .01 uf 100V	91984	CKO5BX103K 350037	1	500878
68	1A1A6A1C29,C31,C51	6	CAPACITOR, MONO 1 uf 50V	91984	CKO6BX105K 350038	3	500878
69	1A1A6A1C20	6	CAPACITOR, MONO .33uf 50V	91984	CKO6BX334K 350039	1	500878
70	1A1A6A1C6-8,C11-15, 17-18,21-23,25-26	6	CAPACITOR, MONO .1uf 100V	91984	CKO6BX104K 350046	31	500878
71	1A1A6A1C28,30,34-35, 40-41,43-47,50,52-54	6	CAPACITOR, MONO .1uf 100V	91984	CKO6BX104K 350046	31	500878
72	1A1A6A1C56	6	CAPACITOR, MONO 680pf 200V	91984	CK05BX681K 350056	1	500878
73	1A1A6A1C57	6	CAPACITOR, MONO .0012uf 200V	91984	CK05BX122K 350057	1	500878
74	1A1A6A1C10,C36,C42	6	CAPACITOR, MONO .0047uf 100V	91984	CK06BX472K 350072	3	500878
75	1A1A6A1C55	6	CAPACITOR, ELECT 100uf 25V	01884	513D107M025BB4 355043	1	500878

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
76	1A1A6A1C48	6	CAPACITOR, ELECT 100uf 63V	01884	515D107M063CC6A 355065	1	500878
77	1A1A6A1C4-5,C37,C49	6	CAPACITOR, 47uf 50V RADIAL	01884	517D476M050AA6A 355025	4	500878
78	1A1A6A1C16,C19,C27	6	CAPACITOR, 10uf 100V RADIAL	01884	515D106M100AA6A 355027	3	500878
79	1A1A6A1C1-C2	6	CAPACITOR, ELECTRO 470uF, 100V	01884	81D471M100HB2D 355061	2	500878
80	1A1A6A1T1	6	TRANS ASSY, HALF BRIDGE PULSE	57362	360540	1	500878
81	1A1A6A1L1	6	TRANSFORMER ASSY	57362	360565	1	500878
82	1A1A6A1T2	6	TRANSFORMER ASSY STEP DOWN REG	57362	360566 360566	1	500878
83		6	SOCKET, IC, 8 PIN	06776	ICO-083-S8T 385047	5	500878
84		6	SOCKET, IC, 14 PIN	06776	ICO-143-S8T 385048	2	500878
85		6	SOCKET, IC 16 PIN	06776	ICO-163-S8T 385049	5	500878
86	1A1A6A1J4	6	HEADER, 14 PIN, PCB MOUNT	1BR23	CWN-350-14-0021 385157	1	500878
87		6	EJECTOR HOOK W/PIN, CW HEADER	1BR23	CWN-LK-L 385158	2	500878
88	1A1A6A1J3	6	HEADER, 4 PIN	27264	26-61-1040 385219	1	500878
89	1A1A6A1J6	6	HEADER, 10 PIN	0K2J7	AWH10G-0232 385224	1	500878
90	1A1A6A1J5	6	HEADER, 26 PIN	0K2J7	AWH26G-0232 385225	1	500878

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
91	1A1A6A1J2	6	HEADER, 8 PIN	27264	26-61-1080 385233	1	500878
92	1A1A6A1J1	6	HEADER, PLUG CONN. 12 PIN	27264	26-61-1120 385304	1	500878
93	1A1A6A2	5	SWITCH ASSY, TIMER	57362	500921	1	500900
94		6	PC BD BLANK, TIMER SWITCH	57362	103006	1	500900
95	1A1A6A2S1	6	SWITCH, ROTARY	76854	2928-P/REL-22-1 370123	1	500900
96		6	HEADER, 14 PIN, PCB MOUNT	1BR23	CWN-350-14-0021 385157	1	500900
97		6	EJECTOR HOOK, W/PIN, CW HEADER	1BR23	CWN-LK-L 385158	2	500900
98	1A1A6A5	5	PC BD ASSY, CAPACITOR	57362	500920	1	500900
99		5	PC BOARD BLANK, CAPACITOR	57362	102984	1	500920
100		5	RESISTOR, 10K 5W 5%	80353	VC5E 340011	2	500920
101		5	CAPACITOR, M.F. 5uF, 200V	01884	735P505X9200L 350074	1	500920
102		5	CAPACITOR, ELECTR. 1000UF 200V	37942	LP102M200H9P3 355063	4	500920
103		5	TERMINAL STRIP 3 POS.		25.135.0353.0 420054	1	500920
104		5	CABLE ASSEMBLY, RIBBON	57362	500925	1	500900
105		5	NAMEPLATE, CONTROL	57362	102960	1	500900

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
106		5	PANEL, FRONT, DENTAL CONTROL	57362	102887	1	500900
107		5	STANDOFF, CONTROL PANEL	57362	102889	2	500900
108		5	BUZZER, ROUND	37942	SC628MN 205006	1	500900
109	1A1A6LF1	5	FILTER, LINE	07793	6EH-1 209003	1	500900
110		5	KNOB, SKT, ARROW, INLAY, 1/4SHAFT	86797	RB-67-3-SK-7-M-1/4 210027	1	500900
111		5	VARISTOR, METAL OXIDE	5R353	V250LA20A 303003	3	500900
112	1A1A6CR1	5	RECTIFIER, BRIDGE	087M7	GBPC1210 306034	1	500900
113		5	POWER TRANSISTOR, IGBT 35A		2MB150L-060 315013	1	500900
114		5	RESISTOR, 10K 1/4W, 5%	44655	OK1035 340001	1	500900
115	1A1A6DS1	5	LAMP, LED GREEN	72619	507-4857-3332-50 370093	1	500900
116	1A1A6DS2	5	LAMP, LED RED	72619	507-4757-3331-50 370094	1	500900
117		5	LAMP HOLDER	72619	508-8738-504 370096	2	500900
118	1A1A6M1	5	METER, PANEL 3/8	41415	DP 650 374008	1	500900
119	1A1A6CB1	5	BREAKER, CIRCUIT 250V, 5A		203-11-1-62-502-G-1 378083	1	500900
120		5	WASHER, EXTERNAL STAR, #6	57362	380528	10	500900

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
121		5	WASHER, SPLIT (#6)	57362	380502	2	500900
122		5	SCREW, PHIL/PH (6-32 X 1/4)	57362	380510	10	500900
123		5	NUT, HEX (8-32)	57362	381000	5	500900
124		5	WASHER, FLAT (#8)	57362	381001	3	500900
125		5	WASHER, SPLIT (#8)	57362	381002	5	500900
126		5	SCREW, DRIVE, SS, #8X3/16 U RD.HD	57362	383118	4	500900
127		5	SMALL PATTERN HWS (6-32 SS)	57362	383056	2	500900
128		5	CONNECTOR, RECP MALE	74545	7486 385011	1	500900
129		5	CONNECTOR, PHONEJACK, MONO	82389	12A 385046	1	500900
130		5	TERMINAL, RING LUG, RED #6	06383	PV18-6R 410006	3	500900
131	1A1A8	4	PLATE ASSY, CONTROL	57362	500901	1	500877
132		5	PLATE ASSY, REAR	57362	800324	1	500901
133	1A1A8A3	5	ANODE SUPPLY ASSY	57362	500879	1	500901
134	1A1A8A4	5	CATHODE SUPPLY ASSY	57362	500880	1	500901
135		5	BRACKET, LOOP	57362	102162	1	500901

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
136		5	BUSHING, FLANGED		FF-1704-4 216024	1	500901
137		5	BUSHING, SLEEVE, 1.503IDx7/8L		AA-1704-4 216030	1	500901
138		5	MOV / VARISTOR	5R353	V33ZA5 303028	1	500901
139		5	RESISTOR, FIXED, 1K 1/2W 5%	91637	RCR07GF102J 340306	1	500901
140		5	CAPACITOR, MONO. 1 uf, 50V	57362	CKO6BX105K 350038	1	500901
141	1A1A8T2	5	TRANSFORMER, CURRENT	57362	360501	1	500901
142	1A1A8T1	5	TRANSFORMER ASSY, CONTROL	57362	360564	1	500901
143		5	TERMINAL, WIRE PIN (RED)	57362	410033	2	500901
144		5	TERMINAL, SOLDER (INSULATED)	57362	410068	1	500901
145		5	TERMINAL STRIP, 6 POLE	06229	21.311.0653 420025	1	500901
146		5	STRIP, MARKING, 1-6	06229	04.630.0480 420026	1	500901
147		5	NUT-HEX (4-40)	57362	380000	8	500901
148		5	WASHER, SPLIT #4	57362	380002	10	500901
149		5	SCREW, PHIL/PH 4-40 X 5/8	57362	380016	2	500901
150		5	WASHER, SPLIT #6	57362	380502	2	500901

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
151		5	SCREW, PHIL/PH 6-32 X 5/16	57362	380505	2	500901
152		5	NUT, HEX 10-32	57362	381500	4	500901
153		5	WASHER, FLAT #10	57362	381501	4	500901
154		5	WASHER, SPLIT #10	57362	381502	4	500901
155		5	LE TIE, T-35, 3 1/2in	57362	T-35 415011	3	500901
156	1A1S1	4	SWITCH ASSY, EXPOSURE	57362	500902	1	500877
157		5	HOOK, HAND CONTROL ASSY	57362	100212	1	500902
158		5	HANDLE, EXPOSURE	57362	101493	1	500902
159		5	SWITCH, SP ST PB MOM	21649	P3-31111 370013	1	500902
160		5	CONNECTOR, STEREO PLUG		274-285 385097	1	500902
161		5	COIL CORD, 3 CONDUCTOR	52179	23237-36in 400019	1	500902
162		5	RELIEF, STRAIN W/NUT 5/8	2V082	3240 415017	1	500902
163	1A1A5	4	COVER, CONTROL	57362	102888	1	500877
164		4	MATING HUB, CONTROL	57362	102898	1	500877
165		4	LABEL, CONTROL/GENERATOR ASSY	57362	102990	1	500877

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
166		4	SLEEVE, GUIDE	57362	103010	1	500877
167		4	HOOK, HAND SWITCH	46576	1246 218015	1	500877
168		4	SCREW, PHIL/FH 6-32 X 1/4	57362	380529	1	500877
169		4	SCREW, PHIL/FH 6-32 X 5/16	57362	380536	1	500877
170		4	SCREW, TRUSS HD 6-32x1/4LG SS	57362	380548	8	500877
171		4	SCREW, PHIL/FH 8-32 X 3/8	57362	381009	6	500877
172		4	SCREW, PHIL OVLHD 10-32X3/8 SS 82D	57362	381575	4	500877
173	1A3	3	ARM ASSY, SCISSOR	57362	500882	1	500876
174		4	HUB, ADAPTER, DENTAL	57362	102882	1	500882
175		4	SCALE, VERTICAL DEGREES	57362	102884	1	500882
176		4	CLAMP, SWING	57362	103011	1	500882
177		4	SUPPORT, X-RAY SOURCE	57362	103012	1	500882
178		4	BUSHING, LINER		AA-1008-1 216063	1	500882
179		4	WASHER, THRUST		TT-1503-2 216064	1	500882
180		4	ARM, SCISSOR, DENTAL	57362	218109	1	500882

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
181		4	SCREW, PHIL/PH 6-32 X 1/2	57362	380503	2	500882
182		4	SCREW, SCK SET 10-32X1/4 N/TIP SS	57362	381570	1	500882
183		4	SCREW, SHLDR SCKT HD	57362	383124	1	500882
184		4	PIN, SPRING 5/32D		20-076 383595	1	500882
185	1A2	3	SOURCE ASSY, X-RAY	57362	500891	1	500876
186		4	CONE ASSY, X-RAY SOURCE	57362	500897	1	500891
187		4	HOUSING ASSY, TUBE, DENTAL	57362	500898	1	500891
188		4	END CAP, TUBE HOUSING	57362	102797	1	500891
189		4	END CAP, YOKE FITTING	57362	102798	1	500891
190		4	SHIELD DISK, END CAP	57362	102805	1	500891
191		4	BEARING SLEEVE, OUTER SUPPORT	57362	102808	1	500891
192		4	SHIELD DISC, PIVOT END CAP	57362	102809	1	500891
193		4	ANCHOR NUT, TENSION ADJUST	57362	102817	1	500891
194		4	BEARING SLEEVE, INNER SUPPORT	57362	102819	1	500891
195		4	DISC PAD, DRAG BREAK	57362	102820	1	500891

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
196		4	CAP, OUTER, DENTAL	57362	102821	1	500891
197		4	YOKE, X-RAY SOURCE, DENTAL	57362	102881	1	500891
198		4	SCALE HORIZONTAL DEGREES, DENTAL	57362	102883	1	500891
199		4	LABEL, TUBE HOUSING ASSY, DENTAL	57362	102991	1	500891
200		4	STUD, HOUSING	57362	103009	1	500891
201		4	SCREW, SET 8-32X3/4 SS	57362	381065	1	500891
202		4	SCREW, SLOT SET 8-32X3/16 SS	57362	381063	8	500891
203		4	BLOCK, LIMIT, DENTAL	57362	102964	1	500876
204		4	SCREW, SH CAP 8-32 X 1/2	57362	381007	2	500876
205		4	SCREW, PHIL/FH 8-32 X 3/8	57362	381009	3	500891
206		4	PIN, DOWEL 5/16X3/4	3A054	383632 90145A581	1	500876
207		4	H.V. PLUG		B200.125 385307	3	500891
208	2	2	CHAIR ASSY, DENTAL	57362	500892	1	500892
209		3	ARM, LIMITS (WELDMENT)	57362	800306	1	500892
210		3	LEG (WELDMENT)	57362	800322	1	500892

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
211		3	SUPPORT, HEADREST (WELDMENT)	57362	800325	1	500892
212		3	BACKREST (WELDMENT)	57362	800326	1	500892
213		3	WELDMENT, RECLINER ASSY	57362	800327	1	500892
214		3	HUB, MOUNTING	57362	102851	1	500892
215		3	PIN, ROCKER (DENTAL CHAIR)	57362	102852	1	500892
216		3	SPACER, LIMITS ARM	57362	102866	2	500892
217		3	SHAFT, LEG PIVOT(DENTAL CHAIR)	57362	102868	1	500892
218		3	CONTROL SPACER	57362	102869	2	500892
219		3	WEAR WASHER	57362	102870	4	500892
220		3	WASHER, SHIM (DENTAL CHAIR)	57362	102871	2	500892
221		3	BRACKET, ATTACHMENT (LT)	57362	102874	1	500892
222		3	RAIL, CHAIR (RT) DENTAL	57362	102876	1	500892
223		3	RAIL, CHAIR (LT) DENTAL	57362	102877	1	500892
224		3	BRACKET, ATTACHMENT (RT)	57362	102878	1	500892
225		3	SPACER SUPPORT BAR	57362	102970	2	500892

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
226		3	SHAFT, BACKREST (DENTAL)	57362	102975	1	500892
227		3	SHOULDER, PIVOT (DENTAL)	57362	102983	2	500892
228		3	HOUSING, BOLT (DENTAL)	57362	102985	1	500892
229		3	BUSHING, GUIDE (DENTAL)	57362	102986	1	500892
230		3	SPACER, HEADREST (DENTAL)	57362	102987	1	500892
231		3	SPACER, BACKREST (DENTAL)	57362	102988	1	500892
232		3	SPACER, SHOULDER (DENTAL)	57362	102989	2	500892
233		3	BAR, SPACER (DENTAL)	57362	102995	2	500892
234		3	KNOB, 5 POINT STAR	56737	5713 210038	1	500892
235		3	HEADREST - DENTAL		218108	1	500892
236		3	DURAGRAIN SEAT	56737	4170 218110	1	500892
237		3	DURAGRAIN BACK	56737	50564 218111	1	500892
238		3	LANYARD, WIRE (12 in.)	57362	218116	12	500892
239		3	RING, RETAINING .593 EXT		3100-59 219023	2	500892
240		3	RING, RETAINING .500 EXT		1000-50 219024	2	500892

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
241		3	RING, RETAINING .750 EXT		1000-75 219025	2	500892
242		3	WASHER, SPLIT (#8)	57362	381002	2	500892
243		3	SCREW, PHIL/PH (8-32 X 1/4)	57362	381019	2	500892
244		3	SCREW, PHIL/FH (8-32 X 3/8)	57362	381009	4	500892
245		3	SCREW, SCKT/FH (10-32 X 3/8)	57362	381531	6	500892
246		3	SCREW, SOCK. SET (10-32 X 1)	57362	381559	1	500892
247		3	WASHER, FLAT (1/4	57362	382001	4	500892
248		3	BOLT, HEX HEAD (1/4-20 X 5/8)	57362	382016	2	500892
249		3	BOLT, HEX (1/4-20 X 3/4)	57362	382017	2	500892
250		3	SCREW, PHIL/FH (5/16-18 X 1/2)	57362	382537	4	500892
251		3	SCREW, S.H.C.(3/8-24 x 1.5LG.) SS	57362	382562	1	500892
252		3	PIN, QK RELEASE 3/8D	3A054	98320A405 383629	2	500892
253		3	ADHESIVE, THREADLOCKER (6oz TUBE)	57362	384524	1	500892
254		3	LUBRICANT, GREASE	57362	384527	1	500892
255		3	TAPE, DOUBLE BACKED 1in WIDE RL	57362	384568	1	500892

Table 6-3. Major Assemblies Parts List, ALPHA MPDX Portable Dental X-Ray System (Continued)

ITEM NO.	REFERENCE DESIGNATION	IND	PART NAME AND DESCRIPTION	MFR CODE CAGE	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	QTY/ ASSY	SECT. VII DRAWING
256	3	2	CASE ASSY, DENTAL X-RAY SYSTEM	57362	500883	1	500883
257		3	FOOT ASSY, LEVELING, DENTAL	57362	500884	4	500883
258		3	TUBE ASSY, EXTENSION, DENTAL	57362	500885	1	500883
259		3	FRAME ASSY, MAIN, DENTAL	57362	500887	1	500883
260		3	ARM ASSY, TRUSS, DENTAL	57362	500914	1	500883
261		3	LEVEL, CIRCULAR		2-10018 218115	1	500914
262		3	ANGLE BRACKET, REAR RT	57362	102839	1	500883
263		3	HUB, LOCATOR, DENTAL	57362	102841	4	500883
264		3	ANGLE BRACKET, FRONT, DENTAL	57362	102842	2	500883
265		3	BRACE, SUPPORT EXT TUBE, DENTAL	57362	102860	2	500883
266		3	ANGLE BRACKET, REAR	57362	102966	1	500883
267		3	CASE, TRANSIT DENTAL		ZRM2040-0318A2A 201176	1	500883
268		3	CLIP, HOLDER	3A053	17185A51 218059	2	500883
269		3	MONOPOD, TLSCPG LEG 44in	2G788	218117	1	500883

Table 6-4. Numerical Parts List

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
04.630.0480 420026	06229	146		1
1000-50 219024		240		2
1000-75 219025		241		2
100212	57362	157		1
101493	57362	158		1
102162	57362	135		1
102797	57362	188		1
102798	57362	189		1
102805	57362	190		1
102808	57362	191		1
102809	57362	192		1
102817	57362	193		1
102819	57362	194		1
102820	57362	195		1
102821	57362	196		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
102839	57362	262		1
102841	57362	263		4
102842	57362	264		2
102851	57362	214		1
102852	57362	215		1
102860	57362	265		2
102866	57362	216		2
102868	57362	217		1
102869	57362	218		2
102870	57362	219		4
102871	57362	220		2
102874	57362	221		1
102876	57362	222		1
102877	57362	223		1
102878	57362	224		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
102881	57362	197		1
102882	57362	174		1
102883	57362	198		1
102884	57362	175		1
102887	57362	106		1
102888	57362	163		1
102889	57362	107		2
102898	57362	164		1
102932	57362	11		1
102960	57362	105		1
102964	57362	203		1
102966	57362	266		1
102970	57362	225		2
102975	57362	226		1
102983	57362	227		2

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
102984	57362	99		1
102985	57362	228		1
102986	57362	229		1
102987	57362	230		1
102988	57362	231		1
102989	57362	232		2
102990	57362	165		1
102991	57362	199		1
102995	57362	233		2
103006	57362	94		1
103009	57362	200		1
103010	57362	166		1
103011	57362	176		1
103012	57362	177		1
1246 218015	46576	167		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
12A 385046	82389	129		1
17185A51 218059	3A053	268		2
1N 823 303018	04713	17		1
1N4005 300002	04713	14		8
1N4148 300001	04713	13		4
1N4742A 303012	04713	16		2
1N5373 303019	04713	18		2
2-10018 218115		261		1
20-076 383595		184		1
203-11-1-62-502-G-1 378083		119		1
21.311.0653 420025	06229	145		1
218108		235		1
218109	57362	180		1
218116	57362	238		12
218117	2G788	269		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
23237-36in 400019	52179	161		1
25.135.0353.0 420054		103		1
26-61-1040 385219	27264	88		1
26-61-1080 385233	27264	91		1
26-61-1120 385304	27264	92		1
274-285 385097		160		1
2928-P/REL-22-1 370123	76854	95		1
2MB150L-060 315013		113		1
2N2222A 310018	04713	23		1
306018 306018	9Y535	15		17
3100-59 219023		239		2
3240 415017	2V082	162		1
3292X-1-103 345069	57922	65		1
3292X-1-104 345068	57922	64		2
3292X-1-253 345070	57922	66		2

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
360501	57362	141		1
360540	57362	80		1
360564	57362	142		1
360565	57362	81		1
360566 360566	57362	82		1
380000	57362	147		8
380002	57362	148		10
380016	57362	149		2
380502	57362	121		2
380502	57362	150		2
380503	57362	181		2
380505	57362	151		2
380510	57362	122		10
380528	57362	120		10
380529	57362	168		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
380536	57362	169		1
380548	57362	170		8
381000	57362	123		5
381001	57362	124		3
381002	57362	125		5
381002	57362	242		2
381007	57362	204		2
381009	57362	205		
381009	57362	244		
381009	57362	171		13
381019	57362	243		2
381063	57362	202		8
381065	57362	201		1
381500	57362	152		4
381501	57362	153		4

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
381502	57362	154		4
381531	57362	245		6
381559	57362	246		1
381570	57362	182		1
381575	57362	172		4
382001	57362	247		4
382016	57362	248		4
382017	57362	249		2
382537	57362	250		4
382562	57362	251		1
383056	57362	127		2
383118	57362	126		4
383124	57362	183		1
383632 90145A581	3A054	206		1
384524	57362	253		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
384527	57362	254		1
384568	57362	255		1
410033	57362	143		2
410068	57362	144		1
4170 218110	56737	236		1
500139	57362	4		1
500876	57362	2		1
500877	57362	3		1
500878	57362	10		1
500879	57362	133		1
500880	57362	134		1
500882	57362	173		1
500883	57362	256		1
500884	57362	257		4
500885	57362	258		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
500887	57362	259		1
500890	57362	8		1
500891	57362	185		1
500892	57362	208		1
500893	57362	1		1
500897	57362	186		1
500898	57362	187		1
500900	57362	9		1
500901	57362	131		1
500902	57362	156		1
500914	57362	260		1
500920	57362	98		1
500921	57362	93		1
500925	57362	104		1
50564 218111	56737	237		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
507-4757-3331-50 370094	72619	116		1
507-4857-3332-50 370093	72619	115		1
508-8738-504 370096	72619	117		2
513D107M025BB4 355043	01884	75		1
515D106M100AA6A 355027	01884	78		3
515D107M063CC6A 355065	01884	76		1
517D476M050AA6A 355025	01884	77		4
5713 210038	56737	234		1
577202B00000 218107		12		3
6EH-1 209003	07793	109		1
735P505X9200L 350074	01884	101		1
7484NC 385013	88342	5		1
7486 385011	74545	128		1
800306	57362	209		1
800322	57362	210		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
800324	57362	132		1
800325	57362	211		1
800326	57362	212		1
800327	57362	213		1
8115VW 385027	07858	6		1
81D471M100HB2D 355061	01884	79		2
98320A405 383629	3A054	252		2
AA-1008-1 216063		178		1
AA-1704-4 216030		137		1
AWH10G-0232 385224	0K2J7	89		1
AWH26G-0232 385225	0K2J7	90		1
B200.125 385307		207		3
CCR250J750 340170	37942	47		1
CD4009C(N)OR(E) 335071	4R685	32		1
CD4011C(N)OR(E) 335070	4R685	31		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
CK05BX122K 350057	91984	73		1
CK05BX681K 350056	91984	72		1
CK06BX472K 350072	91984	74		3
CKO5BX103K 350037	91984	67		1
CKO6BX104K 350046	91984	70		31
CKO6BX104K 350046	91984	71		31
CKO6BX105K 350038	57362	140		1
CKO6BX105K 350038	91984	68		3
CKO6BX334K 350039	91984	69		1
CWN-350-14-0021 385157	1BR23	86		1
CWN-350-14-0021 385157	1BR23	96		1
CWN-LK-L 385158	1BR23	97		2
CWN-LK-L 385158	1BR23	87		2
DP 650 374008	41415	118		1
FF-1704-4 216024		136		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
GBPC1210 306034	087M7	112		1
ICM7260JE 335001	1E566	30		1
ICO-083-S8T 385047	06776	83		5
ICO-143-S8T 385048	06776	84		2
ICO-163-S8T 385049	06776	85		5
IN4746A 303034	04713	20		1
IN5363A 303030	04713	19		2
IRF630 310016	9Y535	22		3
LF347 330028	4R685	26		1
LM320T-15 330033	4R685	28		1
LM340T-15 330032	4R685	27		1
LP102M200H9P3 355063	37942	102		4
MC7805C 330009	04713	25		1
NE555V 330001	4R685	24		5
OK1015 340029	44655	37		2

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
OK1025 340014	44655	35		13
OK1035 340001	44655	33		8
OK1035 340001	44655	114		1
OK1045 340035	44655	38		2
OK2215 340045	44655	39		1
OK4735 340025	44655	36		2
P3-31111 370013	21649	159		1
PV18-6R 410006	06383	130		3
RB-67-3-SK-7-M-1/4 210027	86797	110		1
RC07G183K 340214	44655	50		1
RC07G204K 340063	91637	41		1
RC07G470K 340304	91637	63		2
RC07G510KS 340281	91637	55		2
RC07G681KS 340198	91637	49		2
RC20G510KS 340159	91637	46		2

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
RC42G100KS 340280	91637	54		2
RCR07FG125J 340006	91637	34		1
RCR07G472JS 340060	91637	40		2
RCR07GF102J 340306	91637	139		1
RCR07GF152J 340302	91637	61		1
RCR07GF274 340216	91637	51		1
RCR07GF471J 340065	91637	42		1
RCR20G101JM 340132	91637	44		2
RN55C1000F 340286	91637	58		1
RN55C1002K 340152	91637	45		3
RN55C1053F 340283	91637	56		2
RN55C1400F 340307	91637	62		1
RN55C1503F 340299	91637	59		1
RN55C2553F 340285	91637	57		1
RN55C3742FJ 340301	91637	60		1

Table 6-4. Numerical Parts List (Continued)

MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MFR CODE CAGE	MAPL ITEM NO	NATIONAL STOCK NUMBER	TOTAL QTY
RN55C3831F 340234	91637	52		1
RN55C9092FJ 340128	91637	43		1
RNC55H2552FS 340208	91637	48		1
RNC55H3401FS 340277	91637	53		2
SC628MN 205006	37942	108		1
SG3525A 330034	4L042	29		3
SJO-1342 400012	53909	7		15
T-35 415011	57362	155		3
TT-1503-2 216064		179		1
V250LA20A 303003	5R353	111		3
V33ZA5 303028	5R353	138		1
VC5E 340011	80353	100		2
VN10KM 310013	3G591	21		2
ZRM2040-0318A2A 201176		267		1

Table 6-5. Reference Designation List

REFERENCE DESIGNATION	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MAPL ITEM NO.
1	500876	2
1A1	500877	3
1A1A5	102888	163
1A1A6	500900	9
1A1A6A1	500878	10
1A1A6A1C1-C2	81D471M100HB2D 355061	79
1A1A6A1C10,C36,C42	CK06BX472K 350072	74
1A1A6A1C16,C19,C27	515D106M100AA6A 355027	78
1A1A6A1C20	CKO6BX334K 350039	69
1A1A6A1C24,C39	CKO5BX103K 350037	67
1A1A6A1C28,30,34-35, 40-41,43-47,50,52-54	CKO6BX104K 350046	71
1A1A6A1C29,C31,C51	CKO6BX105K 350038	68
1A1A6A1C4-5,C37,C49	517D476M050AA6A 355025	77
1A1A6A1C48	515D107M063CC6A 355065	76
1A1A6A1C55	513D107M025BB4 355043	75

Table 6-5. Reference Designation List (Continued)

REFERENCE DESIGNATION	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MAPL ITEM NO.
1A1A6A1C56	CK05BX681K 350056	72
1A1A6A1C57	CK05BX122K 350057	73
1A1A6A1C6-8,C11-15, 17-18,21-23,25-26	CKO6BX104K 350046	70
1A1A6A1CR1-4,CR16-18 CR30	1N4005 300002	14
1A1A6A1CR19	IN4746A 303034	20
1A1A6A1CR20-21,23,39	1N4148 300001	13
1A1A6A1CR22	1N 823 303018	17
1A1A6A1CR30-31	1N4742A 303012	16
1A1A6A1CR32-33	1N5373 303019	18
1A1A6A1CR5-6	IN5363A 303030	19
1A1A6A1CR7-15, CR24-27,CR34-37	306018 306018	15
1A1A6A1J1	26-61-1120 385304	92
1A1A6A1J2	26-61-1080 385233	91
1A1A6A1J3	26-61-1040 385219	88
1A1A6A1J4	CWN-350-14-0021 385157	86

Table 6-5. Reference Designation List (Continued)

REFERENCE DESIGNATION	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MAPL ITEM NO.
1A1A6A1J5	AWH26G-0232 385225	90
1A1A6A1J6	AWH10G-0232 385224	89
1A1A6A1L1	360565	81
1A1A6A1Q1,Q5-6	IRF630 310016	22
1A1A6A1Q2	2N2222A 310018	23
1A1A6A1Q3-4	VN10KM 310013	21
1A1A6A1R10,R24,R38, R56-57,R63,R41	OK1035 340001	33
1A1A6A1R11	RNC55H2552FS 340208	48
1A1A6A1R12,R21	3292X-1-253 345070	66
1A1A6A1R13,R42,R45	RN55C1002K 340152	45
1A1A6A1R16	RCR07GF274 340216	51
1A1A6A1R17	RN55C9092FJ 340128	43
1A1A6A1R18	RN55C1503F 340299	59
1A1A6A1R19,R54	3292X-1-104 345068	64
1A1A6A1R20	RN55C3742FJ 340301	60

Table 6-5. Reference Designation List (Continued)

REFERENCE DESIGNATION	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MAPL ITEM NO.
1A1A6A1R23,R47	RCR07G472JS 340060	40
1A1A6A1R25	RCR07FG125J 340006	34
1A1A6A1R27,R37	OK1045 340035	38
1A1A6A1R28	RCR07GF152J 340302	61
1A1A6A1R3,R59	RC07G510KS 340281	55
1A1A6A1R34-35	RC07G681KS 340198	49
1A1A6A1R36	RN55C1053F 340283	56
1A1A6A1R39-40	RC07G470K 340304	63
1A1A6A1R4	OK2215 340045	39
1A1A6A1R43	3292X-1-103 345069	65
1A1A6A1R46	RC07G204K 340063	41
1A1A6A1R49	RCR07GF471J 340065	42
1A1A6A1R5	RC07G183K 340214	50
1A1A6A1R50	RN55C3831F 340234	52
1A1A6A1R51-52	RC20G510KS 340159	46

Table 6-5. Reference Designation List (Continued)

REFERENCE DESIGNATION	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MAPL ITEM NO.
1A1A6A1R53	RN55C2553F 340285	57
1A1A6A1R55	RN55C1000F 340286	58
1A1A6A1R58,R64	OK1015 340029	37
1A1A6A1R6,R14-15,R22 R26,R29-33,R48,60-61	OK1025 340014	35
1A1A6A1R65-66	RC42G100KS 340280	54
1A1A6A1R67	RN55C1400F 340307	62
1A1A6A1R68-69	RCR20G101JM 340132	44
1A1A6A1R7,R31	RNC55H3401FS 340277	53
1A1A6A1R8	CCR250J750 340170	47
1A1A6A1R9,R62	OK4735 340025	36
1A1A6A1T1	360540	80
1A1A6A1T2	360566 360566	82
1A1A6A1U1-2,U5,U10, U15	NE555V 330001	24
1A1A6A1U12	LM340T-15 330032	27
1A1A6A1U13	LM320T-15 330033	28

Table 6-5. Reference Designation List (Continued)

REFERENCE DESIGNATION	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MAPL ITEM NO.
1A1A6A1U14	MC7805C 330009	25
1A1A6A1U3	ICM7260JE 335001	30
1A1A6A1U4	CD4011C(N)OR(E) 335070	31
1A1A6A1U6	CD4009C(N)OR(E) 335071	32
1A1A6A1U7-8,U11	SG3525A 330034	29
1A1A6A1U9	LF347 330028	26
1A1A6A2	500921	93
1A1A6A2S1	2928-P/REL-22-1 370123	95
1A1A6A5	500920	98
1A1A6CB1	203-11-1-62-502-G-1 378083	119
1A1A6CR1	GBPC1210 306034	112
1A1A6DS1	507-4857-3332-50 370093	115
1A1A6DS2	507-4757-3331-50 370094	116
1A1A6LF1	6EH-1 209003	109
1A1A6M1	DP 650 374008	118

Table 6-5. Reference Designation List (Continued)

REFERENCE DESIGNATION	MANUFACTURER PART NUMBER /DYNARAD PART NUMBER	MAPL ITEM NO.
1A1A8	500901	131
1A1A8A3	500879	133
1A1A8A4	500880	134
1A1A8T1	360564	142
1A1A8T2	360501	141
1A1S1	500902	156
1A1W1	500139	4
1A2	500891	185
1A3	500882	173
2	500892	208
3	500883	256

SECTION 7

DIAGRAMS

7-1 INTRODUCTION

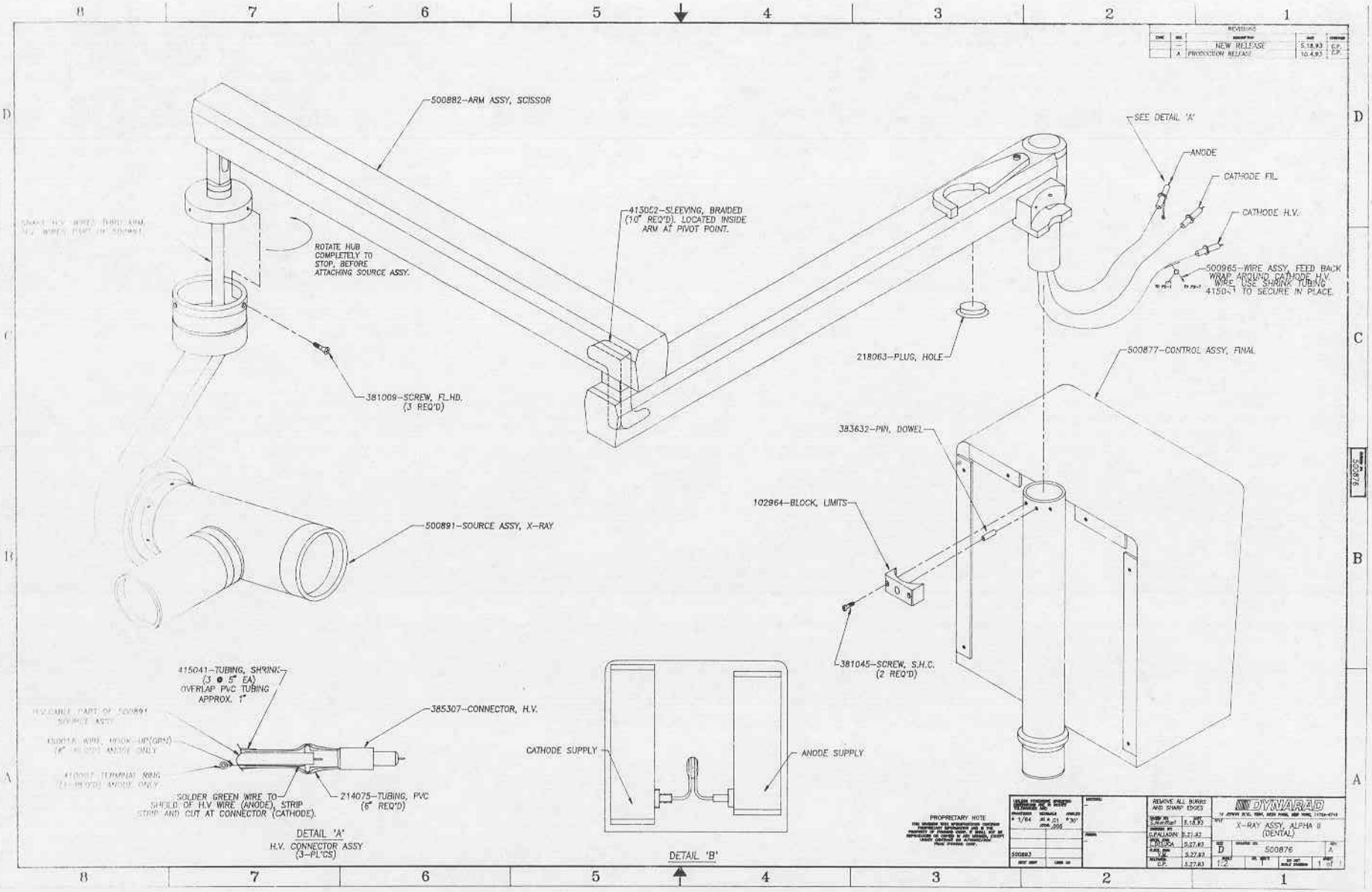
This section contains the maintenance diagrams required to support the ALPHA MPDX Portable Dental X-Ray System. Table 7-1 provides a numerically sequenced list of all drawings including complete drawing number (abbreviated drawing numbers are not used), drawing title, and applicable revision for each drawing. The drawing revision letter reflects the revision in effect during the initial production run and during the preparation of this manual.

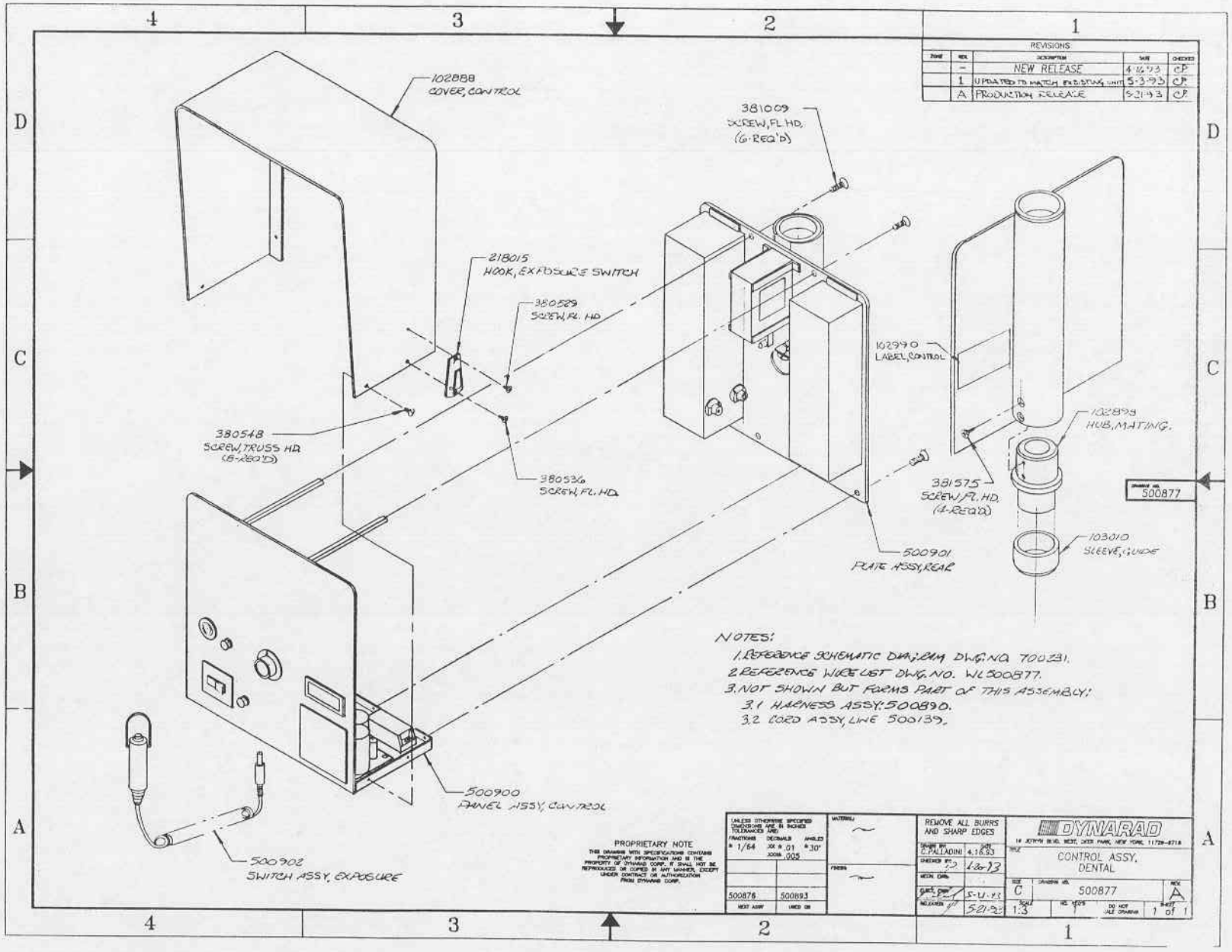
Table 7-1. ALPHA MPDX Portable Dental X-Ray System Drawings List

Drawing number	Title	Revision	Revision date	Page number
500876	X-Ray Unit 1, Assembly Drawing	A	10/4/93	7-3
500877	Control Assembly, Exploded View	A	5/21/93	7-4
500878	Control Board Subassembly 1A1A1 Assembly Drawing	C	10/4/93	7-5
500882	Scissor Arm Assembly 1A3 Exploded View	A	8/26/93	7-6
500883	Carrying Case Unit 3, Exploded View	A	8/24/93	7-7
500891	X-Ray Source Assembly 1A2 Exploded View	A	8/27/93	7-8
500892	Chair Unit 2, Exploded View	A	8/26/93	7-9
500893	Alpha MPDX Assembly	A	10/4/93	7-10
500900	Control Panel Assembly, Exploded View	B	9/28/93	7-11
500901	Control Plate Assembly, Exploded View	A	10/4/93	7-12
500914	Truss Arm, Exploded View	A	8/26/93	7-13
500920	Capacitor Board Subassembly Assembly Drawing	-	-	7-14
500921	Timer Board Assembly Assembly Drawing	-	-	7-15
700231	X-Ray Unit 1, Chassis Schematic/ Wiring Diagram	A	10/4/93	7-16

Table 7-1. ALPHA MPDX Portable Dental X-Ray System Drawings List (continued)

Drawing number	Title	Revision	Revision date	Page number
700233	Anode Supply Schematic Diagram	-	-	7-17
700234	Cathode Supply Schematic Diagram	-	-	7-18
700256	Timer Board Assembly Schematic Diagram	-	-	7-19
700232	Control Board Subassembly 1A1A1, Schematic Diagram	C	10/4/93	7-20


500882–ARM ASSY, SCISSOR
SEE DETAIL 'A'
ANODE
CATHODE FIL.
CATHODE H.V.
415052–SLEEVING, BRAIDED (10" REQ'D). LOCATED INSIDE ARM AT PIVOT POINT.
ROTATE HUB COMPLETELY TO STOP, BEFORE ATTACHING SOURCE ASSY.
500965–WIRE ASSY, FEED BACK WRAP AROUND CATHODE H.V. WIRE. USE SHRINK TUBING 415041 TO SECURE IN PLACE.
218063–PLUG, HOLE
500877–CONTROL ASSY, FINAL
381009–SCREW, FL.HD. (3 REQ'D)
383632–PIN, DOWEL
102964–BLOCK, LIMITS
500891–SOURCE ASSY, X–RAY
381045–SCREW, S.H.C. (2 REQ'D)
415041–TUBING, SHRINK (3 @ 5" EA) OVERLAP PVC TUBING APPROX. 1"
385307–CONNECTOR, H.V.
SOLDER GREEN WIRE TO SHIELD OF H.V. WIRE (ANODE), STRIP STRIP AND CUT AT CONNECTOR (CATHODE).
214075–TUBING, PVC (6" REQ'D)
DETAIL 'A'
H.V. CONNECTOR ASSY (3–PLCS)
CATHODE SUPPLY
ANODE SUPPLY
DETAIL 'B'
REVISIONS
NEW RELEASE
PRODUCTION RELEASE
PROPRIETARY NOTE
REMOVE ALL BURRS AND SHARP EDGES
DYNARAD
X–RAY ASSY, ALPHA II (DENTAL)
500876
500882
SCALE 1:2
SHEET 1 OF 1


102888
COVER, CONTROL
381009
SCREW, FL HD.
(6 REQ'D)
218015
HOOK, EXPOSURE SWITCH
380529
SCREW, FL. HD
102990
LABEL, CONTROL
102899
HUB, MATING.
380548
SCREW, TRUSS HD
(6 REQ'D)
380536
SCREW, FL. HD.
381575
SCREW, FL. HD.
(4 REQ'D)
500877
500901
PLATE ASSY, REAR
103010
SLEEVE, GUIDE
500900
PANEL ASSY, CONTROL
500902
SWITCH ASSY, EXPOSURE
NOTES:
1. REFERENCE SCHEMATIC DIAGRAM DWG. NO. 700231.
2. REFERENCE WIRE LIST DWG. NO. WL500877.
3. NOT SHOWN BUT FORMS PART OF THIS ASSEMBLY:
3.1 HARNESS ASSY; 500890.
3.2 CORD ASSY, LINE 500139.
REVISIONS
ZONE | REV. | DESCRIPTION | DATE | CHECKED
– | NEW RELEASE | 4-16-93 | CP
1 | UPDATED TO MATCH EXISTING UNIT | 5-3-93 | CP
A | PRODUCTION RELEASE | 5-21-93 | CP
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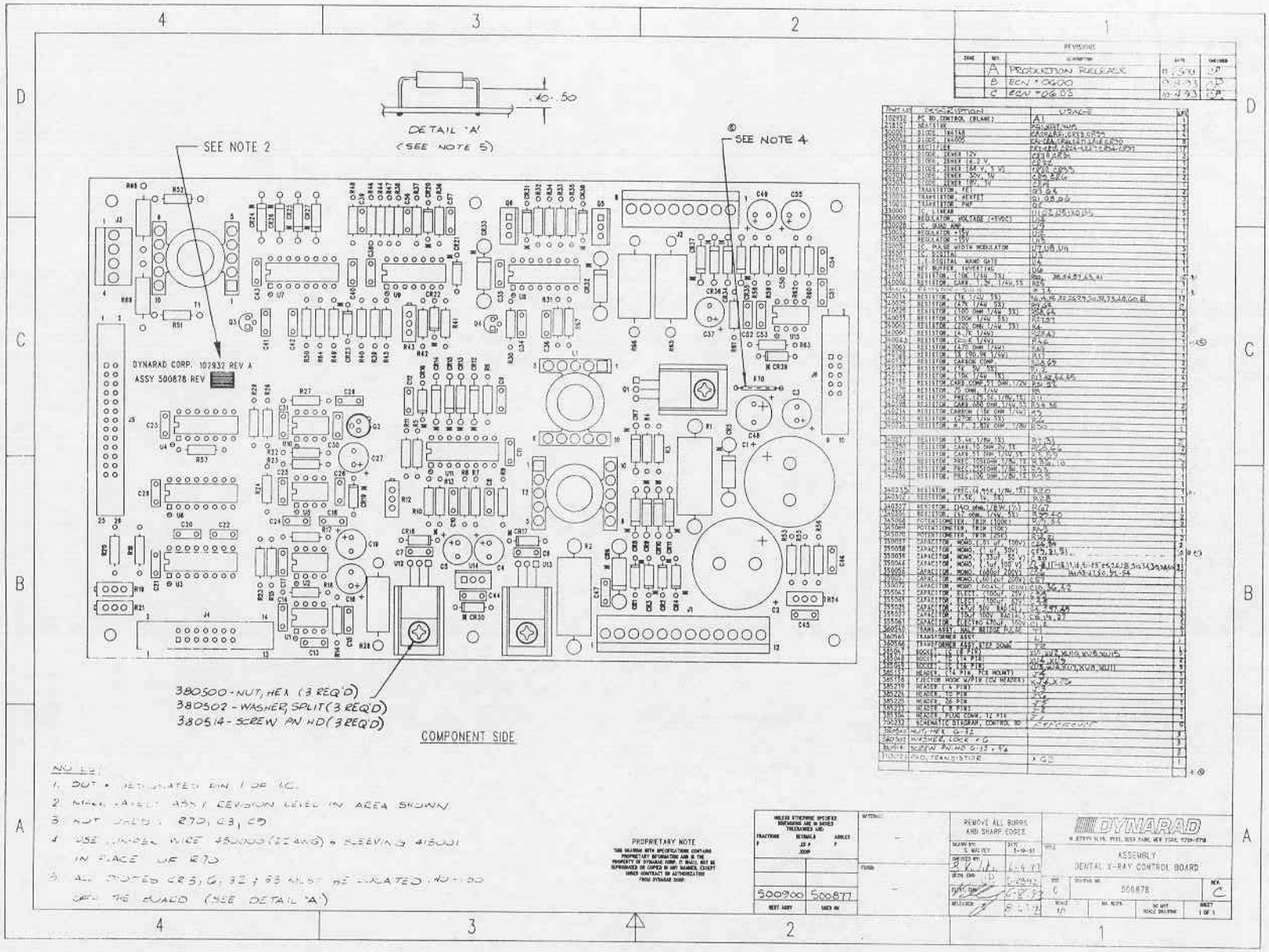
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 | DECIMALS .XX ± .01 .XXX ± .005 | ANGLES ± 30'
500876 | 500893
REMOVE ALL BURRS AND SHARP EDGES
DRAWN BY C. PALLADINI 4.16.93
CHECKED BY 4-20-93
DYNARAD
CONTROL ASSY, DENTAL
SIZE C | DRAWING NO. 500877 | REV. A
SCALE 1:3 | WT. LBS | DO NOT SCALE DRAWING | SHEET 1 OF 1



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	CHECKED
	A	PRODUCTION RELEASE	11-2-93	DP
	B	ECN #0600	01-03-95	DP
	C	ECN #0605	01-03-95	DP

PART NO.	DESCRIPTION	USAGE	QTY
102932	PC BD CONTROL (BLANK)	A1	1
618161	RESISTOR	MOUNTING HDW	1
900001	DIODE, 1N4148	CR10,CR11,CR23,CR24	4
900016	DIODE, 1N4002	CR1,CR2,CR3,CR4,CR5,CR6	6
900018	RECTIFIER	CR7,CR8,CR9,CR12,CR13,CR14	8
900019	DIODE, ZENER 12V	CR18,CR19	2
900020	DIODE, ZENER 12.2 V	CR20,CR21	2
900021	DIODE, ZENER 18V, 5 W	CR15,CR16	2
900022	DIODE, ZENER 20V, 1W	CR17,CR22	2
900023	DIODE, ZENER 10V, 1W	CR38	1
900024	DIODE, ZENER 5.1V, 1W	CR39	1
900025	TRANSISTOR, FET	Q1,Q2,Q3,Q4	4
900026	TRANSISTOR, MOSFET	Q5,Q6,Q7	3
900027	TRANSISTOR, PNP	Q8	1
900028	IC, LINEAR	U1,U2,U3,U10,U11,U15	6
900029	REGULATOR, VOLTAGE (+5VDC)	U12	1
900030	IC, QUAD AMP	U13	1
900031	REGULATOR, +15V	U14	1
900032	REGULATOR, -15V	U15	1
900034	IC, PULSE WIDTH MODULATOR	U7,U8,U9	3
900035	IC, DIGITAL	U4	1
900036	IC, DIGITAL, NAND GATE	U5	1
900037	MOS BUFFER, INVERTING	U6	1
910001	RESISTOR, 10K (1/4W 5%)	R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11,R12,R13,R14,R15,R16,R17,R18,R19,R20,R21,R22,R23,R24,R25,R26,R27,R28,R29,R30,R31,R32,R33,R34,R35,R36,R37,R38,R39,R40,R41,R42,R43,R44,R45,R46,R47,R48,R49,R50,R51,R52,R53,R54,R55,R56,R57,R58,R59,R60,R61,R62,R63,R64,R65,R66,R67,R68,R69,R70	70
910002	RESISTOR, 2.49K (1/4W 5%)	R71,R72,R73,R74	4
910003	RESISTOR, 100K (1/4W 5%)	R75,R76	2
910004	RESISTOR, 150K (1/4W 5%)	R77,R78	2
910005	RESISTOR, 220K OHM (1/4W 5%)	R79,R80	2
910006	RESISTOR, 24.7K (1/4W)	R81,R82	2
910007	RESISTOR, 200 E (1/4W)	R83	1
910008	RESISTOR, 470 OHM (1/4W)	R84	1
910009	RESISTOR, 1K 100.1% (1/8W)	R85	1
910010	RESISTOR, CARBON COMP	R86,R87	2
910011	RESISTOR, 1K, 5W 5%	R88	1
910012	RESISTOR, 150K (1/4W 5%)	R89,R90,R91	3
910013	RESISTOR, CARB COMP 51 OHM, 1/2W	R92,R93	2
910014	RESISTOR, 75 OHM, 1/4W	R94	1
910015	RESISTOR, PREC, (5.36K 1/8W, 1%)	R95	1
910016	RESISTOR, CARB COMP 330 OHM, 1/2W	R96,R97	2
910017	RESISTOR, CARBON (1.5K OHM 1/4W)	R98	1
910018	RESISTOR, (470K 1/4W 5%)	R99	1
910019	RESISTOR, W.W. 3.92K OHM 1/8W 1%	R100	1
910020	RESISTOR, (3.3K 1/8W 5%)	R101	1
910021	RESISTOR, CARB 10 OHM 1/2W 5%	R102,R103	2
910022	RESISTOR, CARB 33 OHM, 1/2W 5%	R104,R105	2
910023	RESISTOR, PREC, (10.00K OHM 1/8W, 1%)	R106	1
910024	RESISTOR, PREC, (4.99K OHM 1/8W 1%)	R107	1
910025	RESISTOR, PREC, (4.64K OHM 1/8W 1%)	R108	1
910026	RESISTOR, PREC, (1.00K OHM 1/8W 1%)	R109	1
910027	RESISTOR, PREC, (1.96K 1/8W 1%)	R110	1
910028	RESISTOR, 17.8K 1/4W 1%	R111	1
910029	RESISTOR, (140 OHM, 1/8W 1%)	R112	1
910030	POTENTIOMETER, TRIM (1K)	R113	1
910031	POTENTIOMETER, TRIM (10K)	R114	1
910032	POTENTIOMETER, TRIM (20K)	R115	1
910033	CAPACITOR, MONO, (.01 uF, 100V)	C1,C2,C3,C4,C5,C6,C7,C8,C9,C10,C11,C12,C13,C14,C15,C16,C17,C18,C19,C20,C21,C22,C23,C24,C25,C26,C27,C28,C29,C30,C31,C32,C33,C34,C35,C36,C37,C38,C39,C40,C41,C42,C43,C44,C45,C46,C47,C48,C49,C50,C51,C52,C53,C54,C55,C56,C57,C58,C59,C60,C61,C62,C63,C64,C65,C66,C67,C68,C69,C70,C71,C72,C73,C74,C75,C76,C77,C78,C79,C80,C81,C82,C83,C84,C85,C86,C87,C88,C89,C90,C91,C92,C93,C94,C95,C96,C97,C98,C99,C100,C101,C102,C103,C104,C105,C106,C107,C108,C109,C110,C111,C112,C113,C114,C115,C116,C117,C118,C119,C120,C121,C122,C123,C124,C125,C126,C127,C128,C129,C130,C131,C132,C133,C134,C135,C136,C137,C138,C139,C140,C141,C142,C143,C144,C145,C146,C147,C148,C149,C150,C151,C152,C153,C154,C155,C156,C157,C158,C159,C160,C161,C162,C163,C164,C165,C166,C167,C168,C169,C170,C171,C172,C173,C174,C175,C176,C177,C178,C179,C180,C181,C182,C183,C184,C185,C186,C187,C188,C189,C190,C191,C192,C193,C194,C195,C196,C197,C198,C199,C200,C201,C202,C203,C204,C205,C206,C207,C208,C209,C210,C211,C212,C213,C214,C215,C216,C217,C218,C219,C220,C221,C222,C223,C224,C225,C226,C227,C228,C229,C230,C231,C232,C233,C234,C235,C236,C237,C238,C239,C240,C241,C242,C243,C244,C245,C246,C247,C248,C249,C250,C251,C252,C253,C254,C255,C256,C257,C258,C259,C260,C261,C262,C263,C264,C265,C266,C267,C268,C269,C270,C271,C272,C273,C274,C275,C276,C277,C278,C279,C280,C281,C282,C283,C284,C285,C286,C287,C288,C289,C290,C291,C292,C293,C294,C295,C296,C297,C298,C299,C300,C301,C302,C303,C304,C305,C306,C307,C308,C309,C310,C311,C312,C313,C314,C315,C316,C317,C318,C319,C320,C321,C322,C323,C324,C325,C326,C327,C328,C329,C330,C331,C332,C333,C334,C335,C336,C337,C338,C339,C340,C341,C342,C343,C344,C345,C346,C347,C348,C349,C350,C351,C352,C353,C354,C355,C356,C357,C358,C359,C360,C361,C362,C363,C364,C365,C366,C367,C368,C369,C370,C371,C372,C373,C374,C375,C376,C377,C378,C379,C380,C381,C382,C383,C384,C385,C386,C387,C388,C389,C390,C391,C392,C393,C394,C395,C396,C397,C398,C399,C400,C401,C402,C403,C404,C405,C406,C407,C408,C409,C410,C411,C412,C413,C414,C415,C416,C417,C418,C419,C420,C421,C422,C423,C424,C425,C426,C427,C428,C429,C430,C431,C432,C433,C434,C435,C436,C437,C438,C439,C440,C441,C442,C443,C444,C445,C446,C447,C448,C449,C450,C451,C452,C453,C454,C455,C456,C457,C458,C459,C460,C461,C462,C463,C464,C465,C466,C467,C468,C469,C470,C471,C472,C473,C474,C475,C476,C477,C478,C479,C480,C481,C482,C483,C484,C485,C486,C487,C488,C489,C490,C491,C492,C493,C494,C495,C496,C497,C498,C499,C500,C501,C502,C503,C504,C505,C506,C507,C508,C509,C510,C511,C512,C513,C514,C515,C516,C517,C518,C519,C520,C521,C522,C523,C524,C525,C526,C527,C528,C529,C530,C531,C532,C533,C534,C535,C536,C537,C538,C539,C540,C541,C542,C543,C544,C545,C546,C547,C548,C549,C550,C551,C552,C553,C554,C555,C556,C557,C558,C559,C560,C561,C562,C563,C564,C565,C566,C567,C568,C569,C570,C571,C572,C573,C574,C575,C576,C577,C578,C579,C580,C581,C582,C583,C584,C585,C586,C587,C588,C589,C590,C591,C592,C593,C594,C595,C596,C597,C598,C599,C600,C601,C602,C603,C604,C605,C606,C607,C608,C609,C610,C611,C612,C613,C614,C615,C616,C617,C618,C619,C620,C621,C622,C623,C624,C625,C626,C627,C628,C629,C630,C631,C632,C633,C634,C635,C636,C637,C638,C639,C640,C641,C642,C643,C644,C645,C646,C647,C648,C649,C650,C651,C652,C653,C654,C655,C656,C657,C658,C659,C660,C661,C662,C663,C664,C665,C666,C667,C668,C669,C670,C671,C672,C673,C674,C675,C676,C677,C678,C679,C680,C681,C682,C683,C684,C685,C686,C687,C688,C689,C690,C691,C692,C693,C694,C695,C696,C697,C698,C699,C700,C701,C702,C703,C704,C705,C706,C707,C708,C709,C710,C711,C712,C713,C714,C715,C716,C717,C718,C719,C720,C721,C722,C723,C724,C725,C726,C727,C728,C729,C730,C731,C732,C733,C734,C735,C736,C737,C738,C739,C740,C741,C742,C743,C744,C745,C746,C747,C748,C749,C750,C751,C752,C753,C754,C755,C756,C757,C758,C759,C760,C761,C762,C763,C764,C765,C766,C767,C768,C769,C770,C771,C772,C773,C774,C775,C776,C777,C778,C779,C780,C781,C782,C783,C784,C785,C786,C787,C788,C789,C790,C791,C792,C793,C794,C795,C796,C797,C798,C799,C800,C801,C802,C803,C804,C805,C806,C807,C808,C809,C810,C811,C812,C813,C814,C815,C816,C817,C818,C819,C820,C821,C822,C823,C824,C825,C826,C827,C828,C829,C830,C831,C832,C833,C834,C835,C836,C837,C838,C839,C840,C841,C842,C843,C844,C845,C846,C847,C848,C849,C850,C851,C852,C853,C854,C855,C856,C857,C858,C859,C860,C861,C862,C863,C864,C865,C866,C867,C868,C869,C870,C871,C872,C873,C874,C875,C876,C877,C878,C879,C880,C881,C882,C883,C884,C885,C886,C887,C888,C889,C890,C891,C892,C893,C894,C895,C896,C897,C898,C899,C900,C901,C902,C903,C904,C905,C906,C907,C908,C909,C910,C911,C912,C913,C914,C915,C916,C917,C918,C919,C920,C921,C922,C923,C924,C925,C926,C927,C928,C929,C930,C931,C932,C933,C934,C935,C936,C937,C938,C939,C940,C941,C942,C943,C944,C945,C946,C947,C948,C949,C950,C951,C952,C953,C954,C955,C956,C957,C958,C959,C960,C961,C962,C963,C964,C965,C966,C967,C968,C969,C970,C971,C972,C973,C974,C975,C976,C977,C978,C979,C980,C981,C982,C983,C984,C985,C986,C987,C988,C989,C990,C991,C992,C993,C994,C995,C996,C997,C998,C999,C1000,C1001,C1002,C1003,C1004,C1005,C1006,C1007,C1008,C1009,C1010,C1011,C1012,C1013,C1014,C1015,C1016,C1017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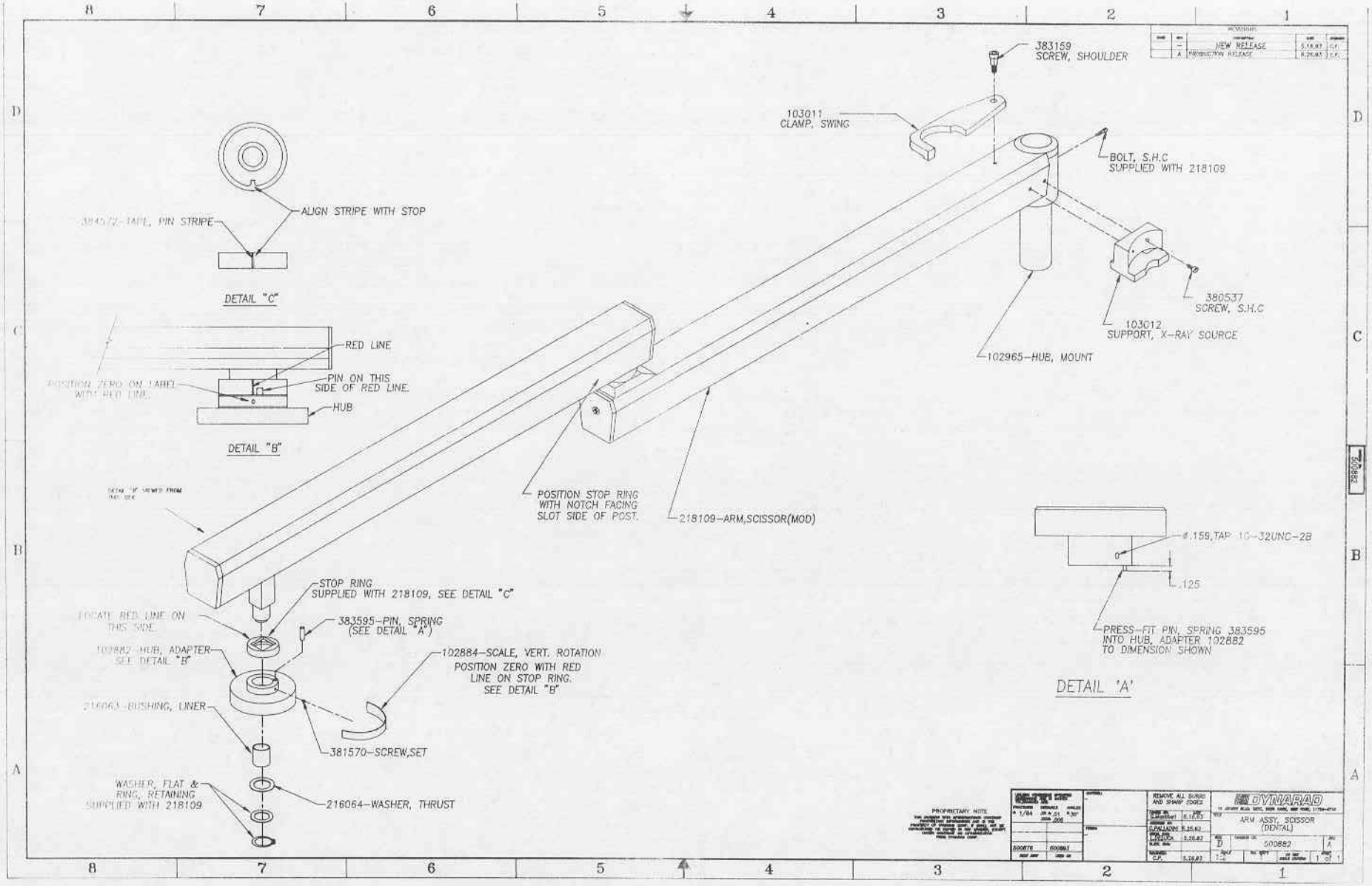
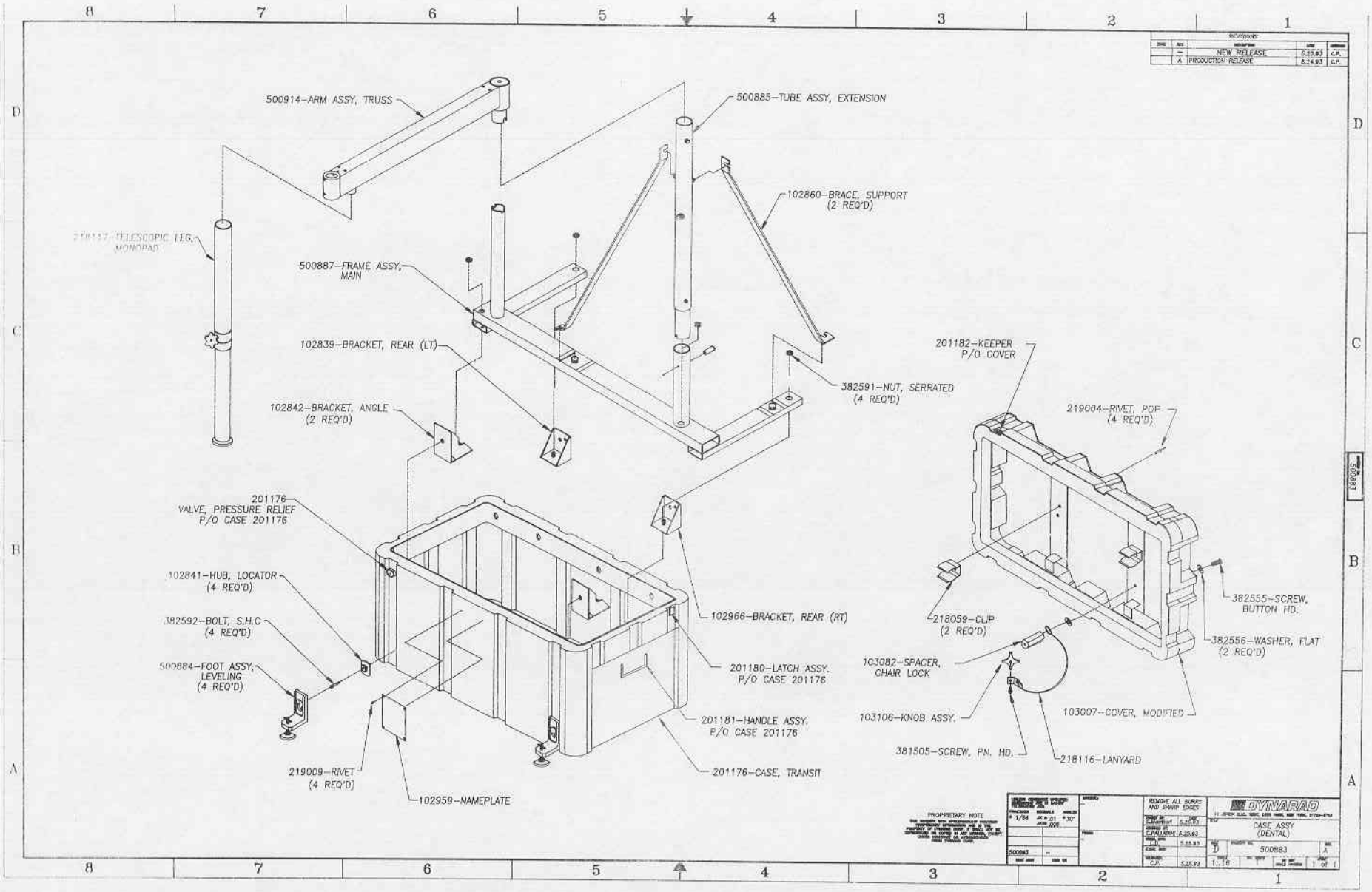
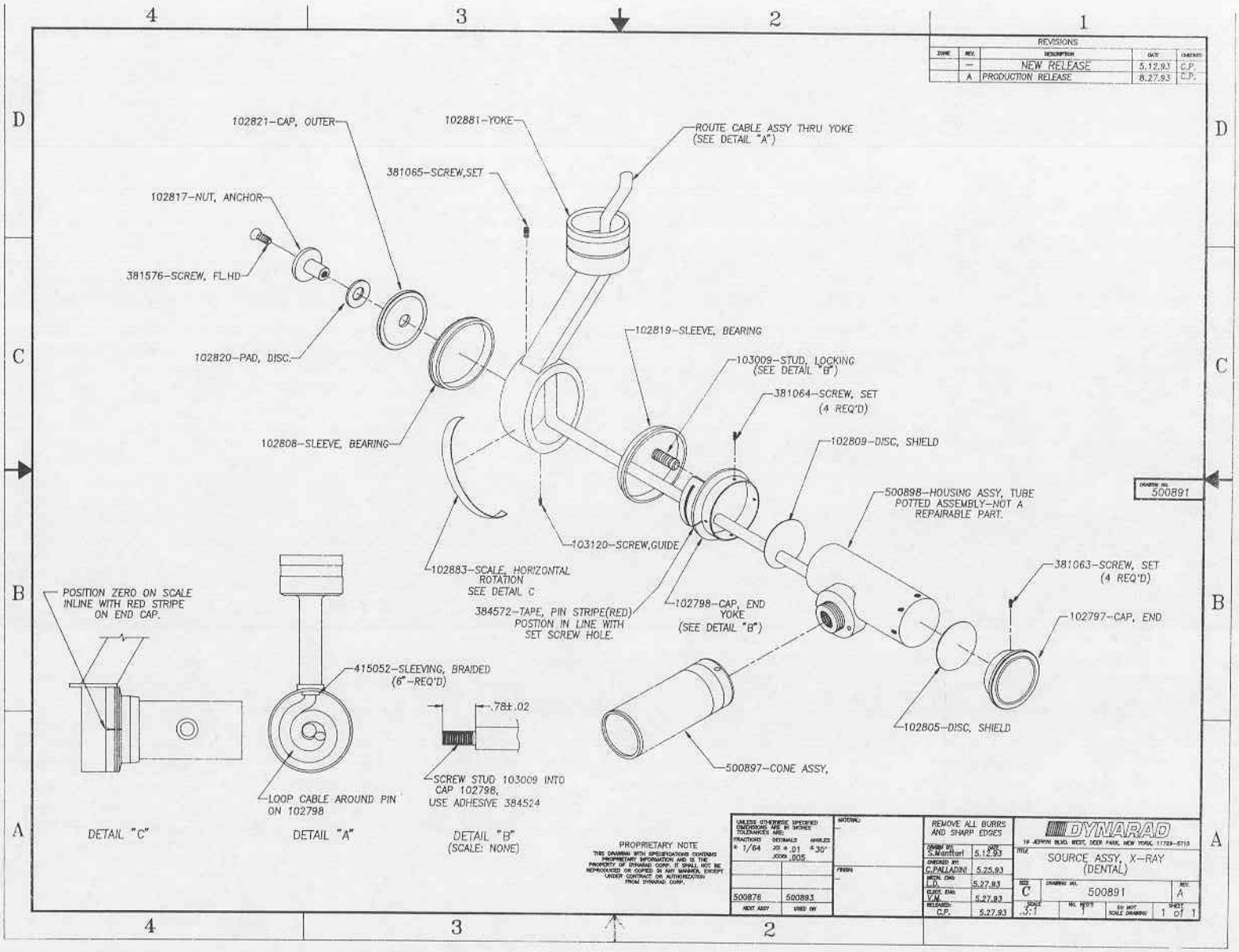

383159
SCREW, SHOULDER
103011
CLAMP, SWING
BOLT, S.H.C
SUPPLIED WITH 218109
380537
SCREW, S.H.C
103012
SUPPORT, X-RAY SOURCE
102965-HUB, MOUNT
ALIGN STRIPE WITH STOP
DETAIL "C"
RED LINE
PIN ON THIS
SIDE OF RED LINE.
HUB
DETAIL "B"
POSITION STOP RING
WITH NOTCH FACING
SLOT SIDE OF POST.
218109-ARM,SCISSOR(MOD)
STOP RING
SUPPLIED WITH 218109, SEE DETAIL "C"
383595-PIN, SPRING
(SEE DETAIL "A")
102884-SCALE, VERT. ROTATION
POSITION ZERO WITH RED
LINE ON STOP RING.
SEE DETAIL "B"
381570-SCREW,SET
216064-WASHER, THRUST
WASHER, FLAT &
RING, RETAINING
SUPPLIED WITH 218109
ø.159,TAP 10-32UNC-2B
.125
PRESS-FIT PIN, SPRING 383595
INTO HUB, ADAPTER 102882
TO DIMENSION SHOWN
DETAIL 'A'
REMOVE ALL BURRS
AND SHARP EDGES
DYNARAD
ARM ASSY, SCISSOR
(DENTAL)
500882


500914–ARM ASSY, TRUSS
500885–TUBE ASSY, EXTENSION
102860–BRACE, SUPPORT (2 REQ'D)
218117–TELESCOPIC LEG, MONOPAD
500887–FRAME ASSY, MAIN
102839–BRACKET, REAR (LT)
382591–NUT, SERRATED (4 REQ'D)
102842–BRACKET, ANGLE (2 REQ'D)
201176 VALVE, PRESSURE RELIEF P/O CASE 201176
102841–HUB, LOCATOR (4 REQ'D)
382592–BOLT, S.H.C (4 REQ'D)
500884–FOOT ASSY, LEVELING (4 REQ'D)
102966–BRACKET, REAR (RT)
201180–LATCH ASSY. P/O CASE 201176
201181–HANDLE ASSY. P/O CASE 201176
201176–CASE, TRANSIT
219009–RIVET (4 REQ'D)
102959–NAMEPLATE
201182–KEEPER P/O COVER
219004–RIVET, POP (4 REQ'D)
382555–SCREW, BUTTON HD.
382556–WASHER, FLAT (2 REQ'D)
218059–CLIP (2 REQ'D)
103082–SPACER, CHAIR LOCK
103106–KNOB ASSY.
103007–COVER, MODIFIED
381505–SCREW, PN. HD.
218116–LANYARD
REVISIONS
– NEW RELEASE 5.20.93 C.P.
A PRODUCTION RELEASE 5.24.93 C.P.
PROPRIETARY NOTE
REMOVE ALL BURRS AND SHARP EDGES
DYNARAD
CASE ASSY (DENTAL)
500883
SIZE D
REV A
SCALE 1:16
SHEET 1 of 1


REVISIONS
ZONE | REV. | DESCRIPTION | DATE | CHECKED
— | NEW RELEASE | 5.12.93 | C.P.
A | PRODUCTION RELEASE | 8.27.93 | C.P.
102821–CAP, OUTER
102881–YOKE
ROUTE CABLE ASSY THRU YOKE (SEE DETAIL "A")
381065–SCREW,SET
102817–NUT, ANCHOR
381576–SCREW, FL.HD
102820–PAD, DISC.
102819–SLEEVE, BEARING
103009–STUD, LOCKING (SEE DETAIL "B")
381064–SCREW, SET (4 REQ'D)
102808–SLEEVE, BEARING
102809–DISC, SHIELD
500898–HOUSING ASSY, TUBE POTTED ASSEMBLY–NOT A REPAIRABLE PART.
500891
103120–SCREW,GUIDE
102883–SCALE, HORIZONTAL ROTATION SEE DETAIL C
384572–TAPE, PIN STRIPE(RED) POSTION IN LINE WITH SET SCREW HOLE.
102798–CAP, END YOKE (SEE DETAIL "B")
381063–SCREW, SET (4 REQ'D)
102797–CAP, END
POSITION ZERO ON SCALE INLINE WITH RED STRIPE ON END CAP.
415052–SLEEVING, BRAIDED (6"–REQ'D)
.78±.02
LOOP CABLE AROUND PIN ON 102798
SCREW STUD 103009 INTO CAP 102798, USE ADHESIVE 384524
102805–DISC, SHIELD
500897–CONE ASSY.
DETAIL "C"
DETAIL "A"
DETAIL "B" (SCALE: NONE)
PROPRIETARY NOTE
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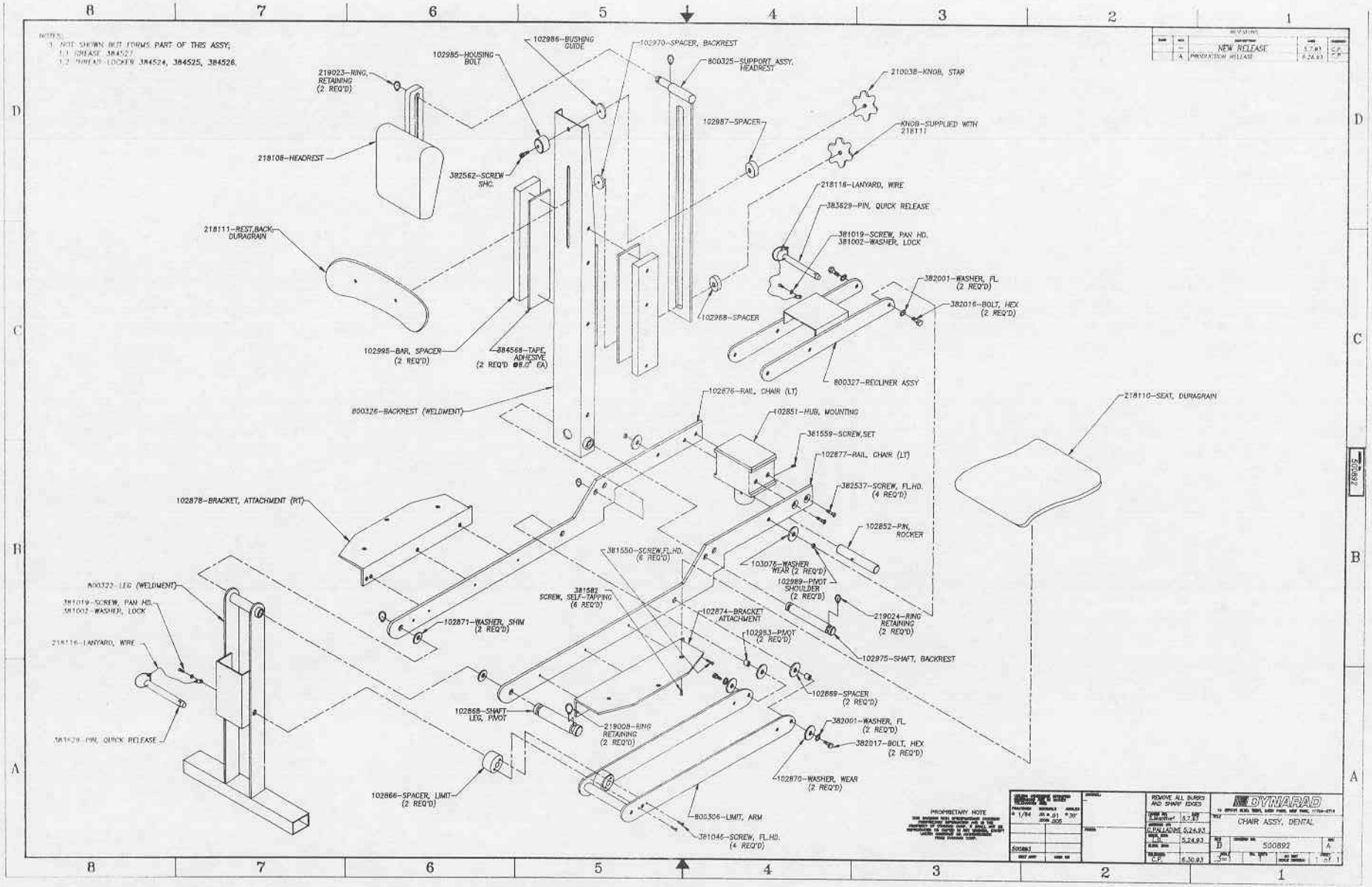
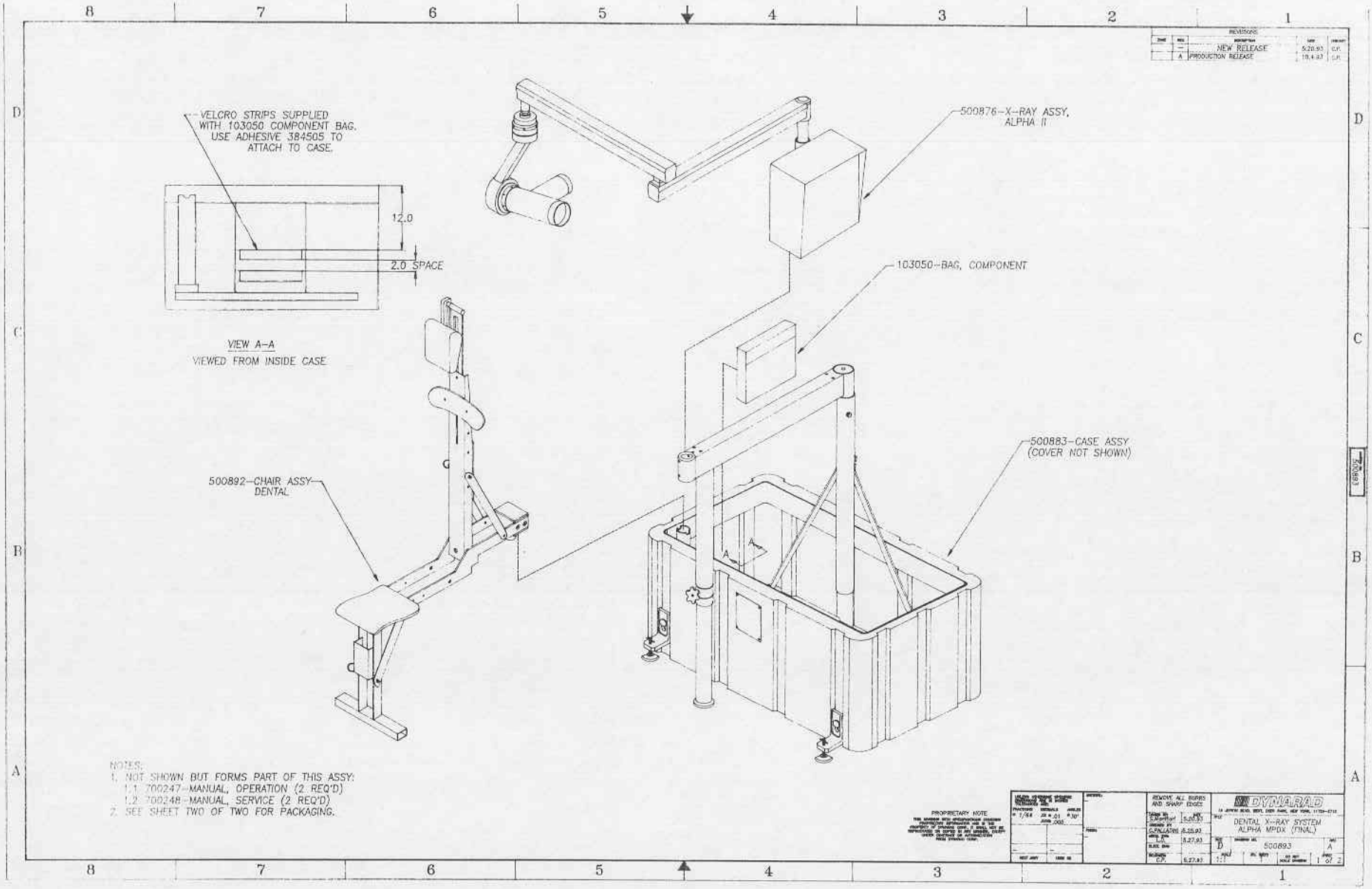
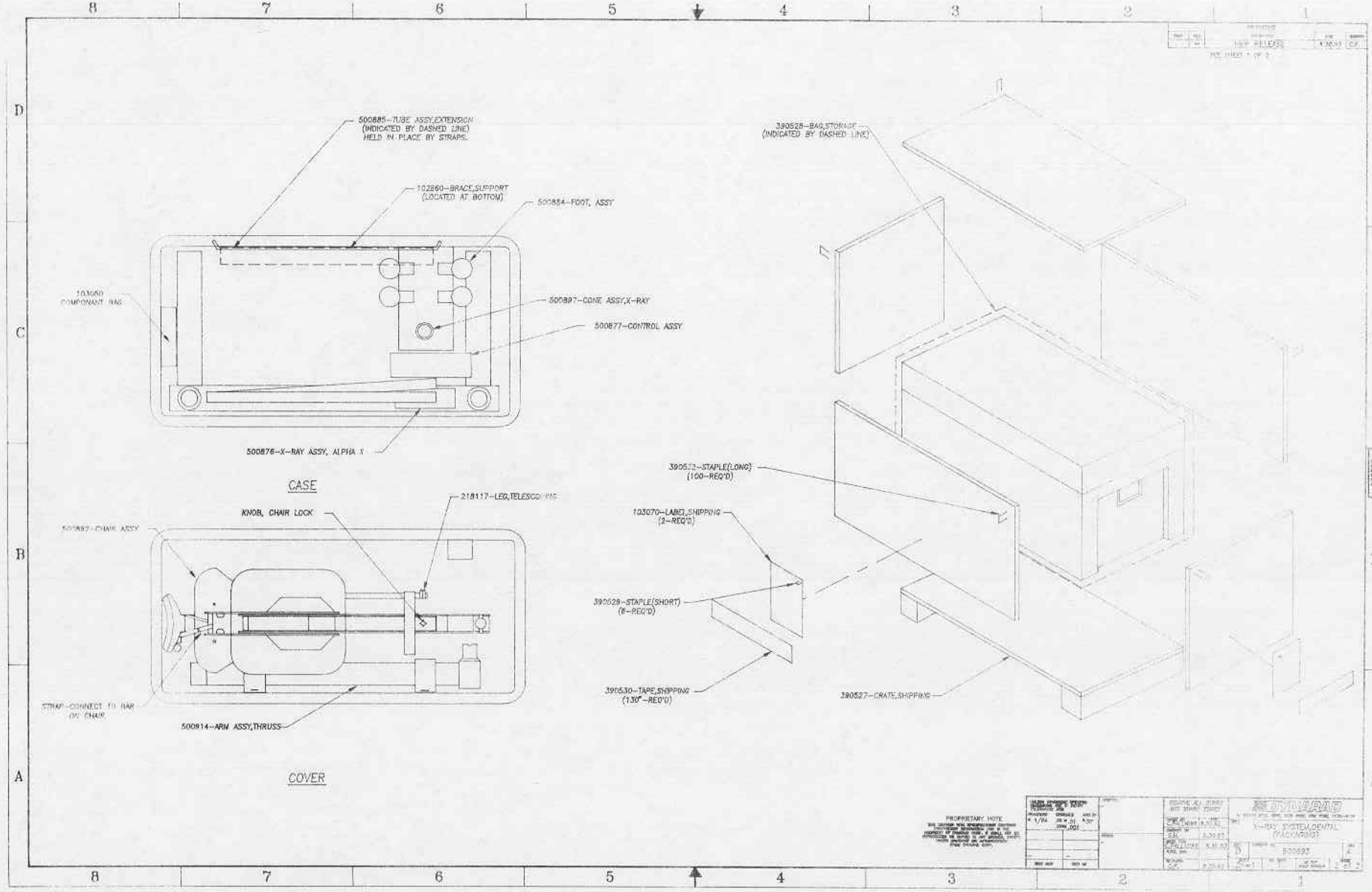
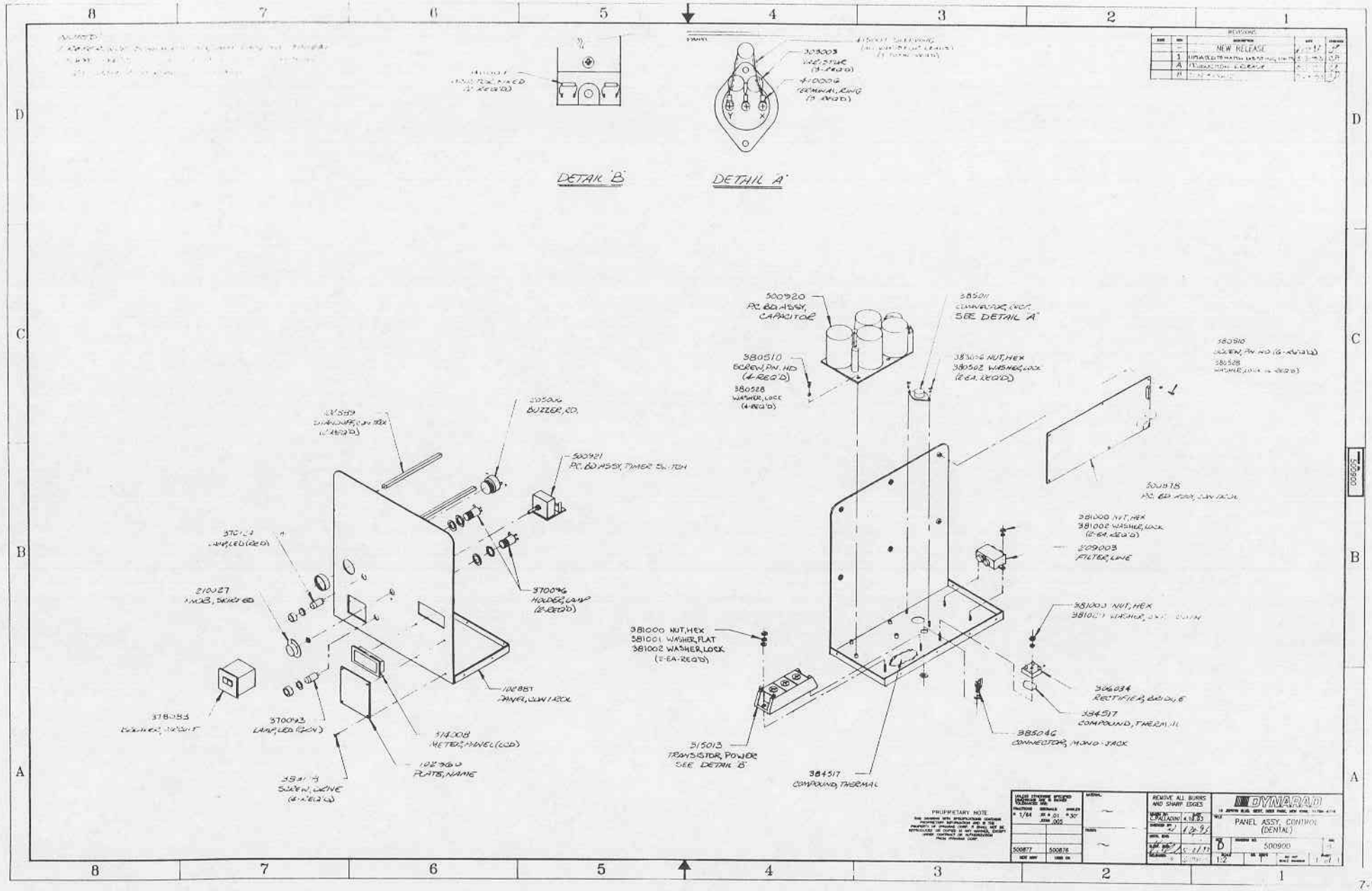
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 30'
MATERIAL
FINISH
500876
NEXT ASSY
500893
USED ON
REMOVE ALL BURRS AND SHARP EDGES
DRAWN BY S.Manttari 5.12.93
CHECKED BY C.PALLADINI 5.25.93
MFGR. ENG. L.D. 5.27.93
QUAL. ENG. V.M. 5.27.93
RELEASED C.P. 5.27.93
DYNARAD
19 JERICHO BLVD. WEST, DEER PARK, NEW YORK, 11729–5715
TITLE SOURCE ASSY, X–RAY (DENTAL)
SIZE C DRAWING NO. 500891 REV. A
SCALE 3:1 WT. LBS 1 DO NOT SCALE DRAWING SHEET 1 OF 1

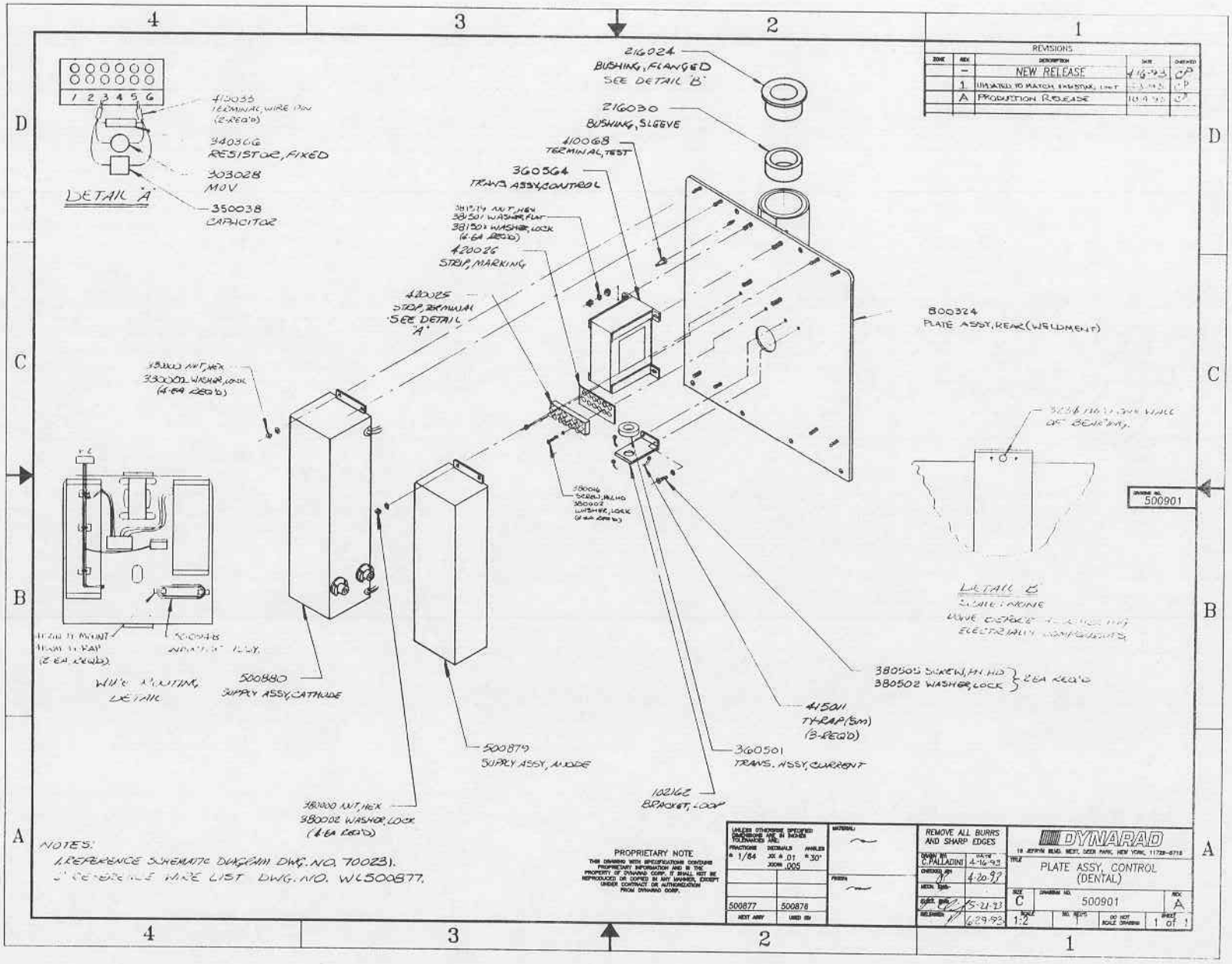

NOTES:
1. NOT SHOWN BUT FORMS PART OF THIS ASSY.
1.1 GREASE 384527
1.2 THREAD-LOCKER 384524, 384525, 384526.
REVISIONS
NEW RELEASE
PRODUCTION RELEASE
102986–BUSHING GUIDE
102985–HOUSING BOLT
102970–SPACER, BACKREST
800325–SUPPORT ASSY, HEADREST
210038–KNOB, STAR
219023–RING, RETAINING (2 REQ'D)
102987–SPACER
KNOB–SUPPLIED WITH 218111
218108–HEADREST
382562–SCREW SHC
218116–LANYARD, WIRE
383629–PIN, QUICK RELEASE
381019–SCREW, PAN HD.
381002–WASHER, LOCK
218111–REST,BACK; DURAGRAIN
382001–WASHER, FL. (2 REQ'D)
382016–BOLT, HEX (2 REQ'D)
102968–SPACER
102995–BAR, SPACER (2 REQ'D)
384568–TAPE, ADHESIVE (2 REQ'D @8.0" EA)
800327–RECLINER ASSY
800326–BACKREST (WELDMENT)
102876–RAIL, CHAIR (LT)
218110–SEAT, DURAGRAIN
102851–HUB, MOUNTING
381559–SCREW,SET
102877–RAIL, CHAIR (LT)
382537–SCREW, FL.HD. (4 REQ'D)
102878–BRACKET, ATTACHMENT (RT)
102852–PIN, ROCKER
381550–SCREW,FL.HD. (6 REQ'D)
103078–WASHER WEAR (2 REQ'D)
102989–PIVOT SHOULDER (2 REQ'D)
800322–LEG (WELDMENT)
381581 SCREW, SELF–TAPPING (6 REQ'D)
102874–BRACKET ATTACHMENT
219024–RING RETAINING (2 REQ'D)
381019–SCREW, PAN HD.
381002–WASHER, LOCK
102871–WASHER, SHIM (2 REQ'D)
102993–PIVOT (2 REQ'D)
218116–LANYARD, WIRE
102975–SHAFT, BACKREST
102869–SPACER (2 REQ'D)
102868–SHAFT LEG, PIVOT
219008–RING RETAINING (2 REQ'D)
382001–WASHER, FL. (2 REQ'D)
383629–PIN, QUICK RELEASE
382017–BOLT, HEX (2 REQ'D)
102870–WASHER, WEAR (2 REQ'D)
102866–SPACER, LIMIT (2 REQ'D)
800306–LIMIT, ARM
381046–SCREW, FL.HD. (4 REQ'D)
PROPRIETARY NOTE
REMOVE ALL BURRS AND SHARP EDGES
DYNARAD
CHAIR ASSY, DENTAL
530892
SCALE 1/4
C.P. 6.30.93

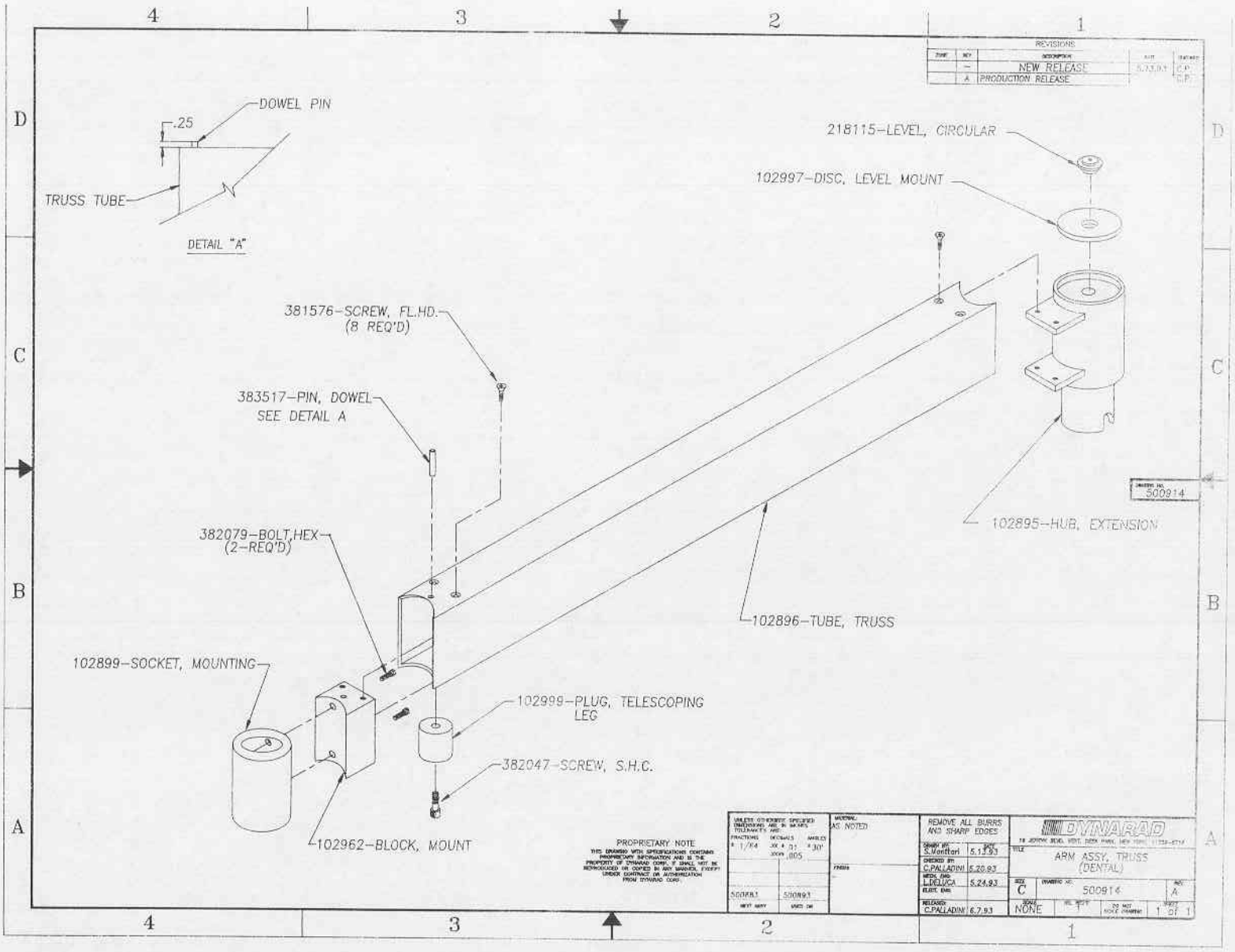

VELCRO STRIPS SUPPLIED WITH 103050 COMPONENT BAG. USE ADHESIVE 384505 TO ATTACH TO CASE.
12.0
2.0 SPACE
VIEW A-A
VIEWED FROM INSIDE CASE
500876-X-RAY ASSY, ALPHA II
103050-BAG, COMPONENT
500883-CASE ASSY (COVER NOT SHOWN)
500892-CHAIR ASSY DENTAL
NOTES:
1. NOT SHOWN BUT FORMS PART OF THIS ASSY:
1.1. 700247-MANUAL, OPERATION (2 REQ'D)
1.2. 700248-MANUAL, SERVICE (2 REQ'D)
2. SEE SHEET TWO OF TWO FOR PACKAGING.
REVISIONS
NEW RELEASE
PRODUCTION RELEASE
PROPRIETARY NOTE
REMOVE ALL BURRS AND SHARP EDGES
DYNARAD
DENTAL X-RAY SYSTEM ALPHA MPDX (FINAL)
500893


500885–TUBE ASSY,EXTENSION (INDICATED BY DASHED LINE) HELD IN PLACE BY STRAPS.
102860–BRACE,SUPPORT (LOCATED AT BOTTOM)
500854–FOOT, ASSY
103080 COMPONANT BAG
500897–CONE ASSY,X-RAY
500877–CONTROL ASSY
500876–X-RAY ASSY, ALPHA X
CASE
KNOB, CHAIR LOCK
218117–LEG,TELESCOPING
500897–CHAIR ASSY
STRAP–CONNECT TO BAR ON CHAIR
500814–ARM ASSY,THRUSS
COVER
390528–BAG,STORAGE (INDICATED BY DASHED LINE)
390522–STAPLE(LONG) (100–REQ'D)
103070–LABEL,SHIPPING (2–REQ'D)
390528–STAPLE(SHORT) (8–REQ'D)
390530–TAPE,SHIPPING (130"–REQ'D)
390527–CRATE,SHIPPING
PROPRIETARY NOTE
MOYLAN
X-RAY SYSTEM,DENTAL (PACKAGING)
500893


DETAIL 'B'
DETAIL 'A'
NEW RELEASE
500920
PC. BD ASSY, CAPACITOR
385011
CONNECTOR, CKT.
SEE DETAIL 'A'
380510
SCREW, PN. HD
(4-REQ'D)
380528
WASHER, LOCK
(4-REQ'D)
380516 NUT, HEX
380502 WASHER, LOCK
(2 EA. REQ'D)
380510
SCREW, PN. HD (6-REQ'D)
380528
WASHER, LOCK (6-REQ'D)
500918
PC. BD ASSY, CONTROL
381000 NUT, HEX
381002 WASHER, LOCK
(2-EA. REQ'D)
209003
FILTER, LINE
381003 NUT, HEX
381001 WASHER, FLAT
381002 WASHER, LOCK
(2-EA-REQ'D)
306034
RECTIFIER, BRIDGE, 6
384517
COMPOUND, THERMAL
385046
CONNECTOR, MONO-JACK
315013
TRANSISTOR, POWER
SEE DETAIL 'B'
384517
COMPOUND, THERMAL
380589
STANDOFF, CONN BRD
(2-REQ'D)
209004
BUZZER, CD.
500921
PC. BD ASSY, TIMER SL-7DH
370013
LAMP, LED (RED)
(2-REQ'D)
370026
HOLDER, LAMP
(2-REQ'D)
210027
KNOB, SKIRTED
378053
SOCKET, CIRCUIT
370093
LAMP, LED (RED)
314008
METER, PANEL (CCD)
102360
PLATE, NAME
102881
PANEL, CONTROL
391013
SCREW, DRIVE
(4-REQ'D)
PROPRIETARY NOTE
500877
500876
REMOVE ALL BURRS AND SHARP EDGES
C. PALADINI 4.18.03
DYNARAD
PANEL ASSY, CONTROL (DENTAL)
500900
D
1/2
500900

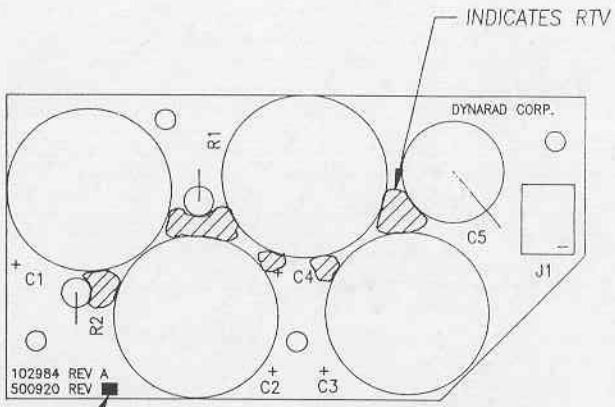
7-11


REVISIONS
NEW RELEASE
PROPRIETARY NOTE
DYNARAD
PLATE ASSY, CONTROL (DENTAL)
500901
216024 BUSHING, FLANGED SEE DETAIL 'B'
216030 BUSHING, SLEEVE
410068 TERMINAL, TEST
360364 TRANS ASSY, CONTROL
420026 STRIP, MARKING
420025 STRIP, TERMINAL SEE DETAIL 'A'
800324 PLATE ASSY, REAR (WELDMENT)
DETAIL 'A'
410033 TERMINAL, WIRE TAP (2 REQ'D)
340366 RESISTOR, FIXED
303028 MOV
350038 CAPACITOR
DETAIL 'B'
SCALE: NONE
500880 SUPPLY ASSY, CATHODE
500879 SUPPLY ASSY, ANODE
360501 TRANS. ASSY, CURRENT
380505 SCREW, PAN HD
380502 WASHER, LOCK
2 EA REQ'D
415011 TY-RAP (5in) (3 REQ'D)
102162 BRACKET, LOOP
NOTES:
1. REFERENCE SCHEMATIC DIAGRAM DWG. NO. 700231.
2. REFERENCE WIRE LIST DWG. NO. WL500877.


REVISIONS
NEW RELEASE
PRODUCTION RELEASE
DOWEL PIN
.25
TRUSS TUBE
DETAIL "A"
218115–LEVEL, CIRCULAR
102997–DISC, LEVEL MOUNT
381576–SCREW, FL.HD.
(8 REQ'D)
383517–PIN, DOWEL
SEE DETAIL A
382079–BOLT,HEX
(2–REQ'D)
102899–SOCKET, MOUNTING
102999–PLUG, TELESCOPING
LEG
382047–SCREW, S.H.C.
102962–BLOCK, MOUNT
102896–TUBE, TRUSS
102895–HUB, EXTENSION
500914
PROPRIETARY NOTE
REMOVE ALL BURRS
AND SHARP EDGES
DRAWN BY
S.Ventitari
5.17.93
CHECKED BY
C.PALLADINI
5.20.93
ENGR. APP.
L.DELUCA
5.24.93
RELEASED
C.PALLADINI
6.7.93
DYNARAD
TITLE
ARM ASSY, TRUSS
(DENTAL)
SIZE
C
DRAWING NO.
500914
REV
A
SCALE
NONE
SHEET
1 OF 1

DRAWING NO. 500920

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	CHECKED
	–	NEW RELEASE	5.20.93	C.P.



BILL OF MATERIALS			
PART NO.	DESCRIPTION	REF. DES.	QTY
102984	PCB, CAPACITOR		1
340011	RESISTOR, 10K,5W,5%	R1, R2	2
350074	CAPACITOR,M.F. 5 F, 200V	C5	1
355063	CAPACITOR, ELECT.1000 F, 200V	C1,C2,C3,C4	4
384539	SEALANT, RTV (RTV162)	--	.01
420054	TERM. STRIP 3 POS.	J1	1
700245	SCHEMATIC		REF

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TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 30'

500900	500877
NEXT ASSY	USED ON

MATERIAL: –

FINISH: –

REMOVE ALL BURRS AND SHARP EDGES

DRAWN BY: S.Manttari	DATE 5.3.93
CHECKED BY: C.PALLADINI	5.4.93
MECH. ENG: C.P.	5.4.93
ELECT. ENG: V.M.	5.3.93
RELEASED: C.P.	5.20.93

DYNARAD
19 JEFRYN BLVD. WEST, DEER PARK, NEW YORK, 11729-5715

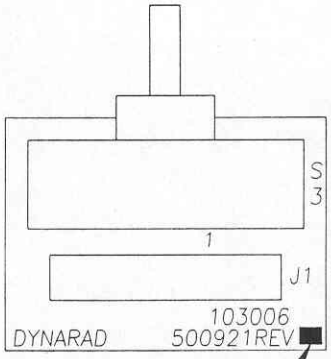
TITLE: CAPACITOR BOARD ASSY (DENTAL)

SIZE	DRAWING NO.	REV.
B	500920	–

SCALE	NO. REQ'D	DO NOT SCALE DRAWING	SHEET
1:1	1		1 of 1

DRAWING NO.
500921

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	CHECKED
	–	NEW RELEASE	5.26.93	S.M.



MARK LATEST REV.
LEVEL IN SPACE PROVIDED

PART NO.	DESCRIPTION	USAGE	QTY.
103006	PCB BLANK	–	1
385157	CONNECTOR	J1	1
385158	EJECTOR	–	2
370123	SWITCH(ROT.)	S3	1
700256	SCHEMATIC	–	REF

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TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 30'

NEXT ASSY	USED ON
500900	500877

MATERIAL: AS NOTED

FINISH: NONE

REMOVE ALL BURRS AND SHARP EDGES

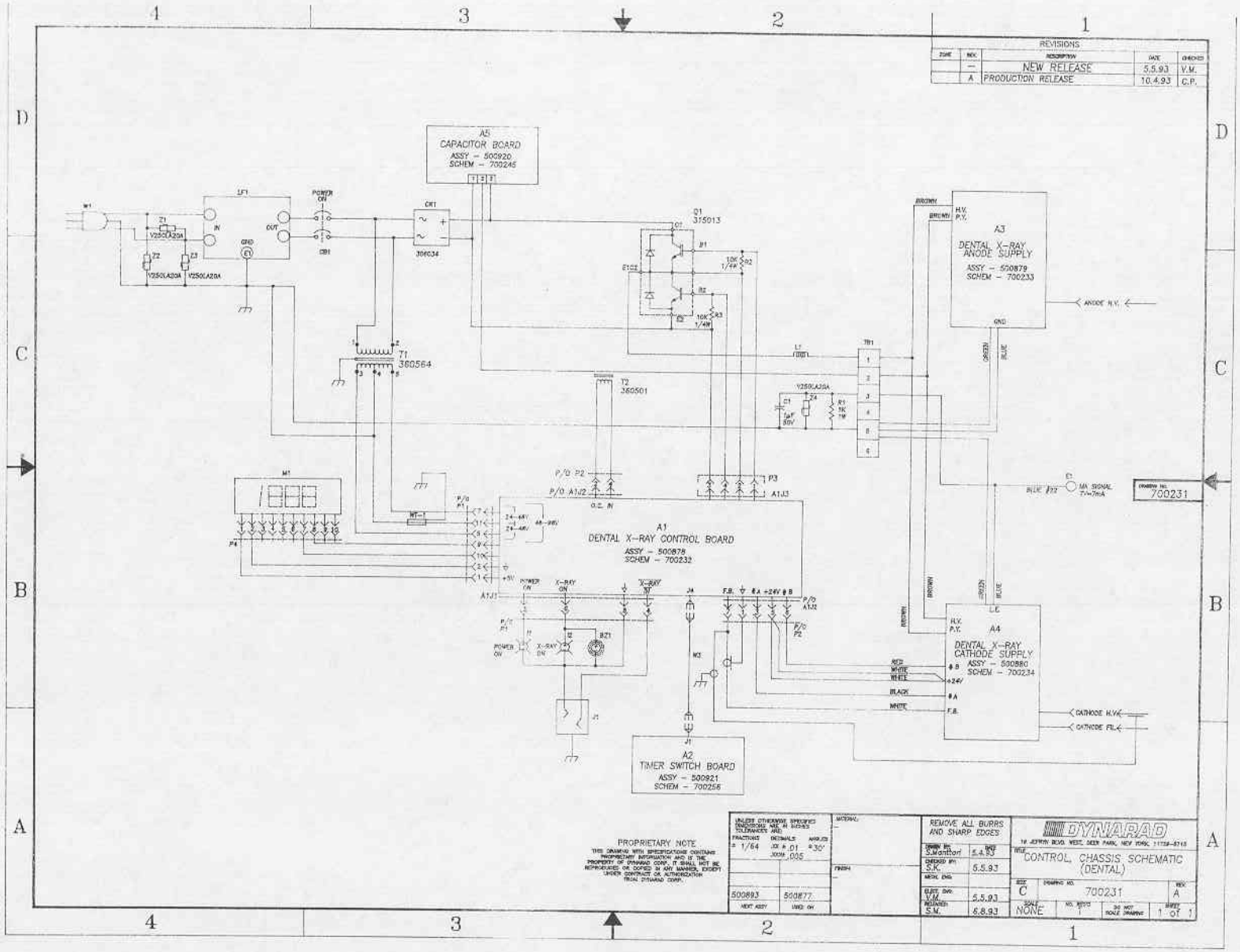
	DATE
DRAWN BY: C.PALLADINI	5.26.93
CHECKED BY: S.M.	5.27.93
MECH. ENG: C.P.	5.27.93
ELECT. ENG: V.M.	5.27.93
RELEASED: C.P.	5.27.93

DYNARAD
19 JEFRYN BLVD. WEST, DEER PARK, NEW YORK, 11729-4698

TITLE
PC BD. ASSY.
TIMER SWITCH(DENTAL)

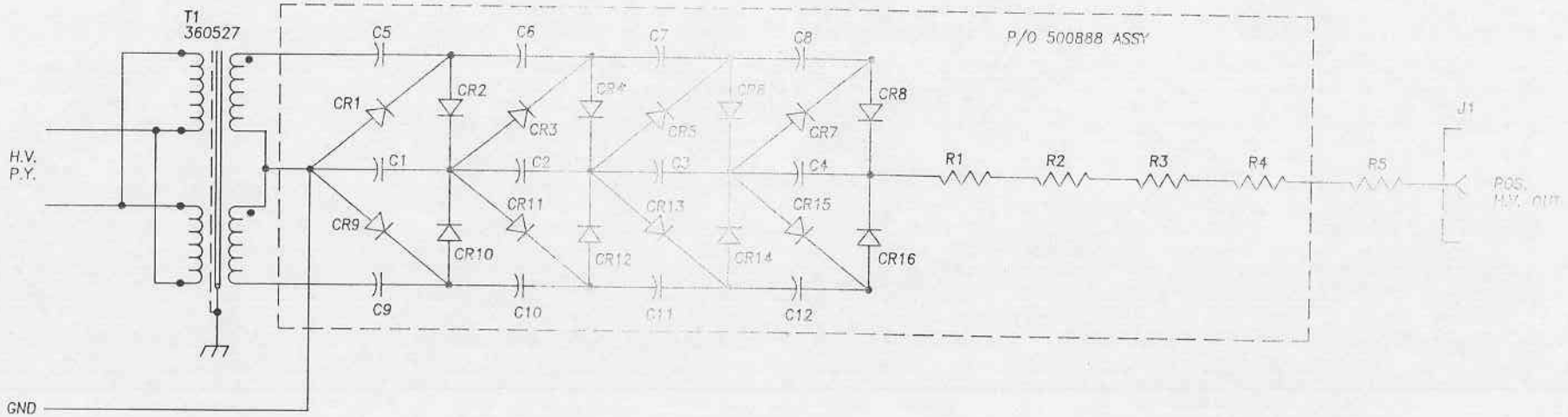
SIZE A | DRAWING NO. 500921

SCALE 1:1 | NO. REQ'D 1 | DO NOT SCALE DRAWING


REVISIONS
ZONE | REV. | DESCRIPTION | DATE | CHECKED
— | NEW RELEASE | 5.5.93 | V.M.
A | PRODUCTION RELEASE | 10.4.93 | C.P.
A5 CAPACITOR BOARD ASSY – 500920 SCHEM – 700245
A1 DENTAL X-RAY CONTROL BOARD ASSY – 500878 SCHEM – 700232
A2 TIMER SWITCH BOARD ASSY – 500921 SCHEM – 700256
A3 DENTAL X-RAY ANODE SUPPLY ASSY – 500879 SCHEM – 700233
A4 DENTAL X-RAY CATHODE SUPPLY ASSY – 500880 SCHEM – 700234
Q1 315013
T1 360564
T2 360501
ANODE H.V.
CATHODE H.V.
CATHODE FIL.
MA SIGNAL 1V=1mA
700231
PROPRIETARY NOTE
REMOVE ALL BURRS AND SHARP EDGES
DYNARAD
S.Wantlart 5.4.93
O.K. 5.5.93
V.M. 5.5.93
S.W. 5.8.93
TITLE CONTROL, CHASSIS SCHEMATIC (DENTAL)
SIZE C DRAWING NO. 700231 REV. A
SCALE NONE NO. REVS 1 DO NOT SCALE DRAWING SHEET 1 OF 1

DRAWING NO. 700233

REVISIONS			
ZONE	REV.	DESCRIPTION	DATE
	—	NEW RELEASE	6.3.93



NOTES:
1. UNLESS OTHERWISE SPECIFIED,
   CAPACITORS ARE 2000PF, 10KV
   DIODES ARE 30KV, 10MA, FAST RECOVERY
   RESISTORS ARE 10K, 2W, CARBON

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500879	500901
NEXT ASSY	USED ON

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 30'

MATERIAL: —

FINISH: —

REMOVE ALL BURRS AND SHARP EDGES

DRAWN BY	S.Manttari	6.3.93
CHECKED BY		
MECH. ENG.		
ELECT. ENG.		6/3/93
RELEASED		

DYNARAD
19 JEFFRYN BLVD. WEST, DEER PARK, NEW YORK, 11729-5715

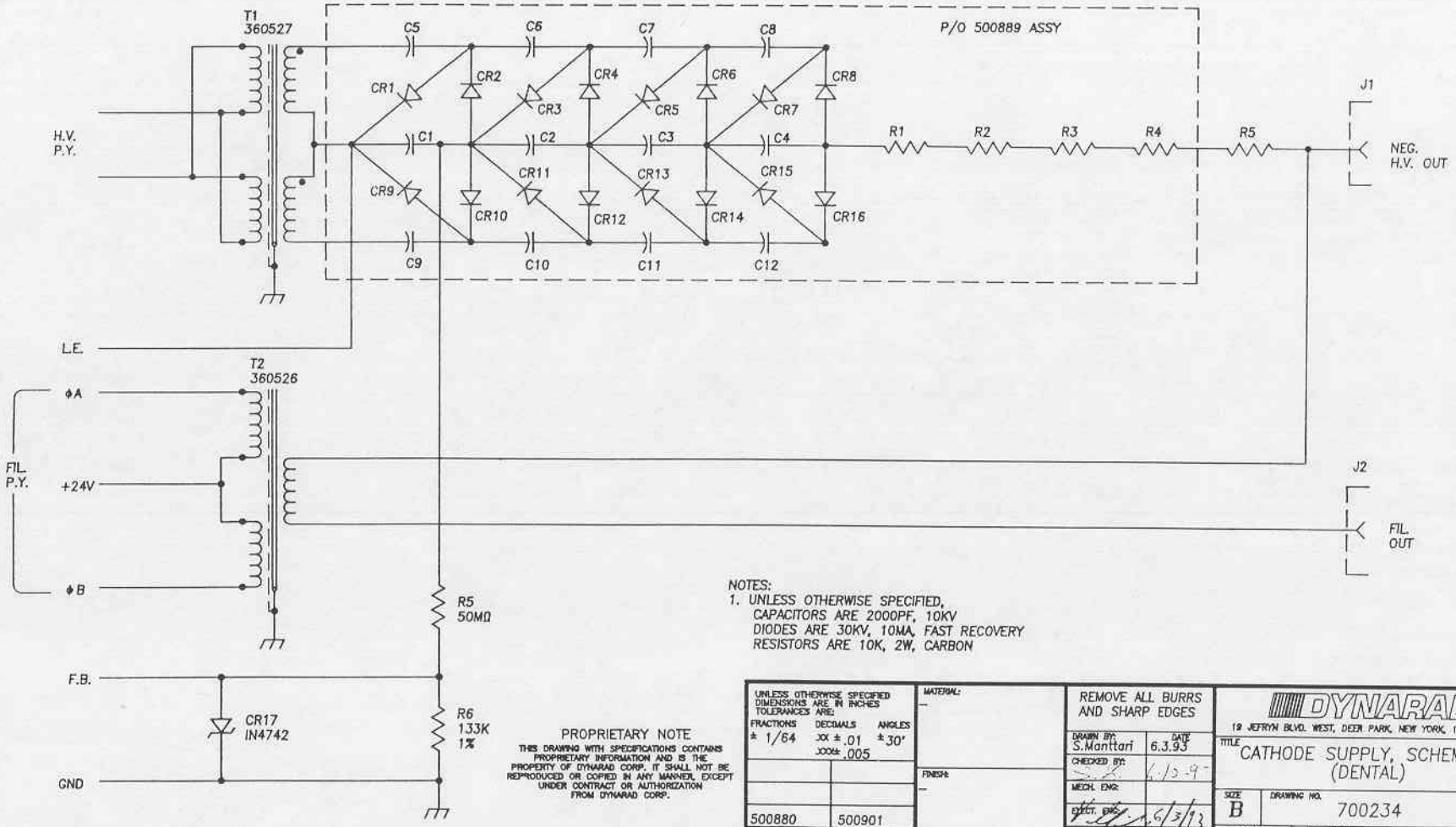
TITLE: ANODE SUPPLY, SCHEMATIC (DENTAL)

SIZE	DRAWING NO.	REV.
B	700233	—

SCALE	NO. REQ'D	DO NOT SCALE DRAWING	SHEET
NONE	1		1 OF 1

DRAWING NO. 700234

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	CHECKED
	—	NEW RELEASE	6.3.93	



NOTES:
1. UNLESS OTHERWISE SPECIFIED,
   CAPACITORS ARE 2000PF, 10KV
   DIODES ARE 30KV, 10MA, FAST RECOVERY
   RESISTORS ARE 10K, 2W, CARBON

PROPRIETARY NOTE
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX± .005 ANGLES ± 30'

NEXT ASSY	USED ON
500880	500901

MATERIAL: —

FINISH: —

REMOVE ALL BURRS AND SHARP EDGES

DRAWN BY: S.Manttari	DATE 6.3.93
CHECKED BY:	
MECH. ENG:	
ELECT. ENG:	6/3/93
RELEASED:	

DYNARAD
19 JEFRYN BLVD. WEST, DEER PARK, NEW YORK, 11729-5715

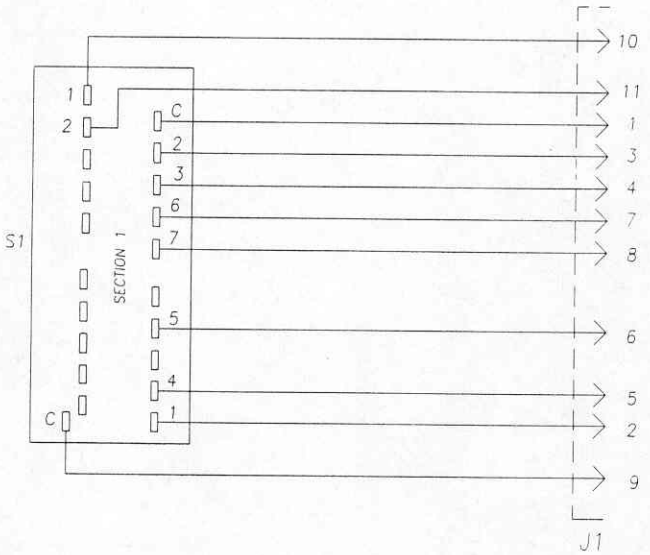
TITLE: CATHODE SUPPLY, SCHEMATIC (DENTAL)

SIZE	DRAWING NO.	REV.
B	700234	—

SCALE	NO. REQ'D	DO NOT SCALE DRAWING	SHEET
NONE	1		1 of 1

DRAWING NO.
700256

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	CHECKED
	–	NEW RELEASE	8.25.93	CP



PROPRIETARY NOTE

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 30'

NEXT ASSY	USED ON
500921	500893

MATERIAL: –

FINISH: –

REMOVE ALL BURRS AND SHARP EDGES

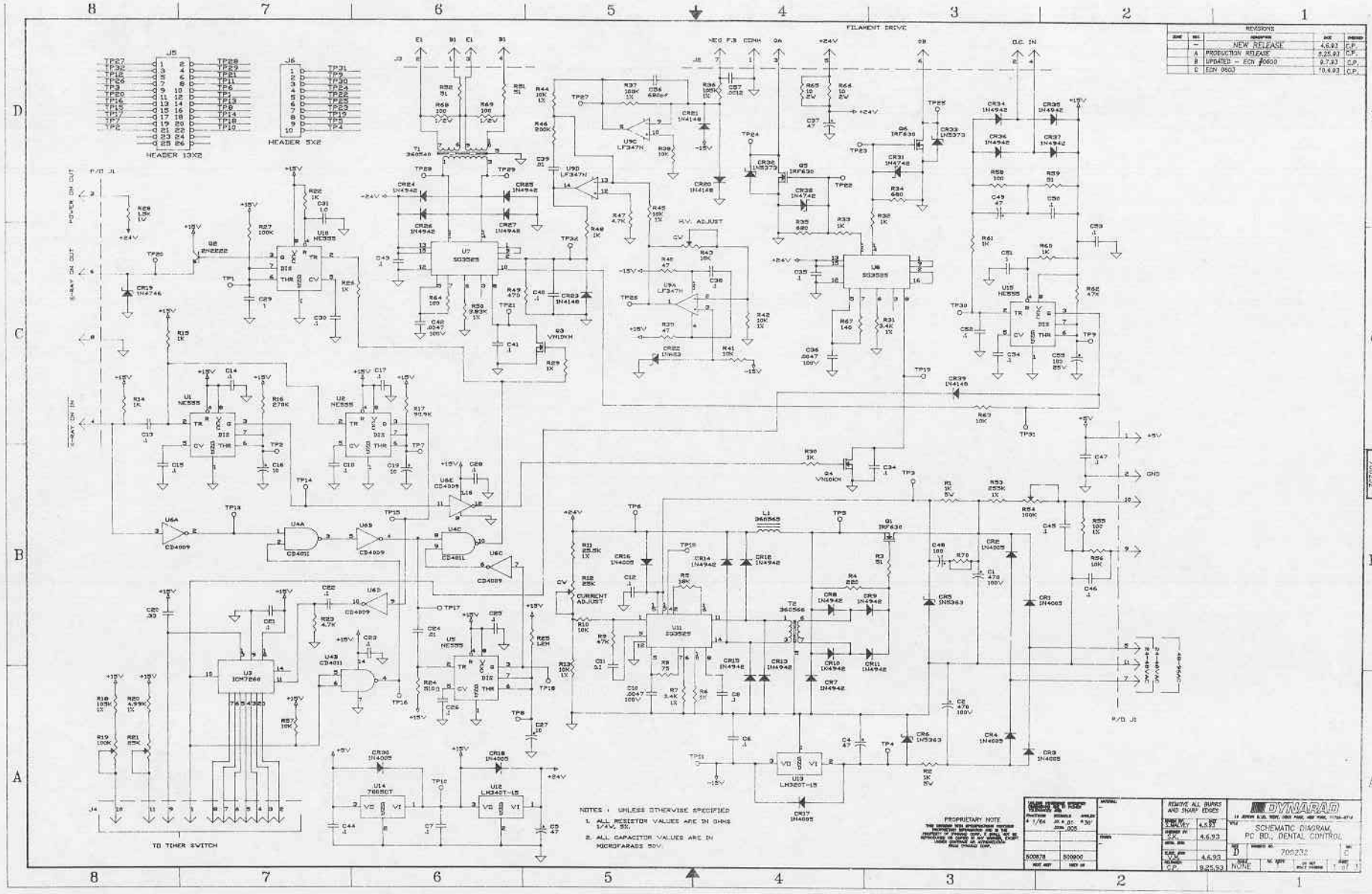
DRAWN BY: S.Mantzari	DATE: 8.25.93
CHECKED BY:	
MECH. ENG.	
ELECT. ENG.	
RELEASED	

DYNARAD
19 JEFRYN BLVD. WEST, DEER PARK, NEW YORK, 11729-5715

TITLE: TIMER BOARD SCHEMATIC (DENTAL)

SIZE	DRAWING NO.	REV.
A	700256	–

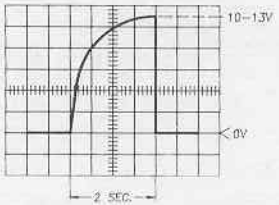
SCALE	NO. REQ'D	DO NOT SCALE DRAWING	SHEET
NONE	–		1


REVISIONS
NEW RELEASE
PRODUCTION RELEASE
UPDATED - ECN #0600
ECN 0603
FILAMENT DRIVE
D.C. IN
HEADER 13X2
HEADER 5X2
TO TIMER SWITCH
NOTES : UNLESS OTHERWISE SPECIFIED
1. ALL RESISTOR VALUES ARE IN OHMS 1/4W, 5%.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS 50V.
PROPRIETARY NOTE
REMOVE ALL BURRS AND SHARP EDGES
DYNARAD
SCHEMATIC DIAGRAM, PC BD., DENTAL CONTROL
705232
NONE

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	–	NEW RELEASE	8.25.93	C.P.

SEE SHEET 1 of 3

TP-1
PROBE:X1
VERT:2V
HORIZ:.5 SEC.



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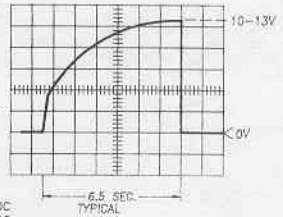
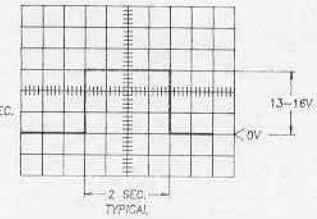
PROBE:X1
VERT:2V
HORIZ:1 SEC.

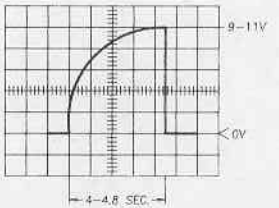


TP-10:+13V TO +17VDC
TP-11:-13V TO -17VDC
TP-12: NOT USED

TP-16
PROBE:X1
VERT:5V
HORIZ:.5 SEC.



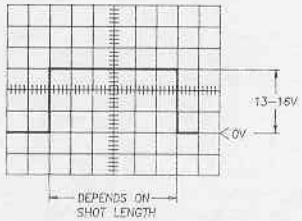
TP-2
PROBE:X1
VERT:2V
HORIZ:1 SEC.



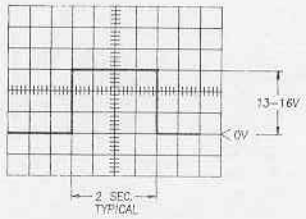
TP-3:+20V TO +28VDC

TP-4:-26V TO -30VDC

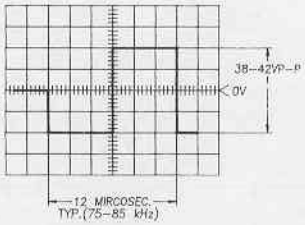
TP-13
PROBE:X1
VERT:5V
HORIZ:.5 SEC.



TP-17
PROBE:X1
VERT:5V
HORIZ:.5 SEC.

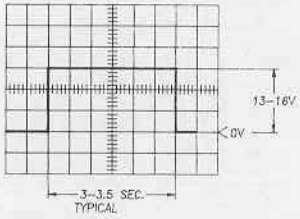


TP-5
PROBE:X10
VERT:1V
HORIZ:2 MICROSEC.

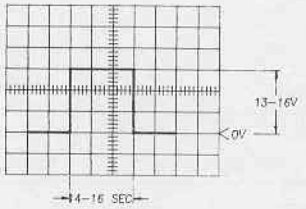


TP-6:+20VDC

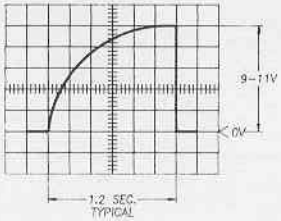
TP-14
PROBE:X1
VERT:5V
HORIZ:.5 SEC.



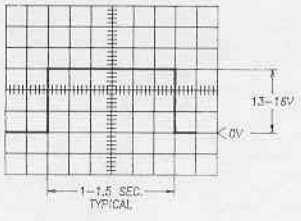
TP-18
PROBE:X1
VERT:5V
HORIZ:5 SEC.



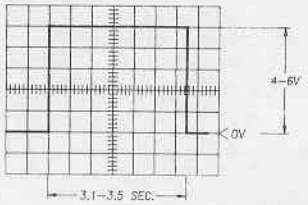
TP-7
PROBE:X1
VERT:2V
HORIZ:.2 SEC.



TP-15
PROBE:X1
VERT:5V
HORIZ:.2 SEC.



TP-19
PROBE:X1
VERT:1V
HORIZ:.5 SEC.



TP-8:NOT USED

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FRACTIONS DECIMALS ANGLES
± 1/64 .XX ± .01 ± 30'
.XXX ± .005

REMOVE ALL BURRS AND SHARP EDGES

DRAWN BY C.PALADINI 8.25.93
ENGINEER APP.
MECH. ENGR.
ELECT. ENGR.
MATERIAL

DYNARAD
19 JEWETT ROAD, WEST, UNION PARK, NEW YORK, 11754-4714

TITLE SCHEMATIC DIAGRAM, TEST POINTS, P.C.BD. DENTAL CONTROL

SIZE D DRAWING NO. 730232 REV. C

SCALE 1:1 WT. SHEET 2 of 3

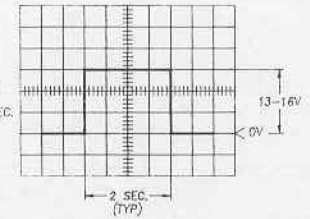
500878	500890
NEXT ASSY	USED ON

7-20

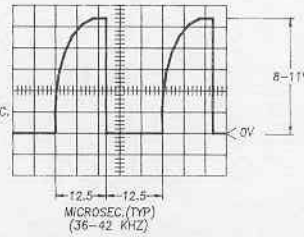
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	—	NEW RELEASE	8.25.83	

SEE SHEET 1 of 3

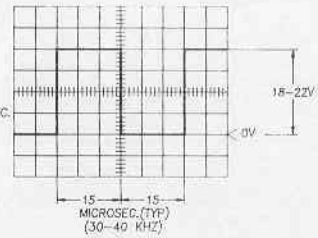
TP-20
PROBE:X1
VERT:5V
HORIZ:.5SEC.



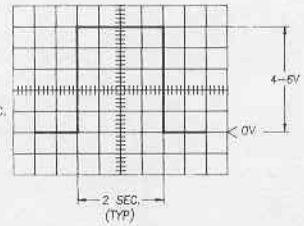
TP-23
PROBE:X1
VERT:2V
HORIZ:5MICROSEC.



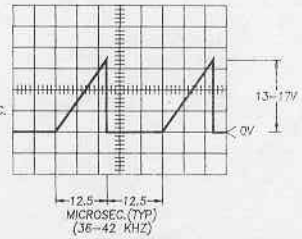
TP-28
PROBE:X1
VERT:5V
HORIZ:5MICROSEC.



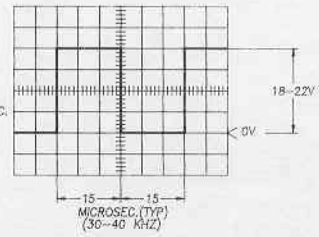
TP-21
PROBE:X1
VERT:1V
HORIZ:.5SEC.



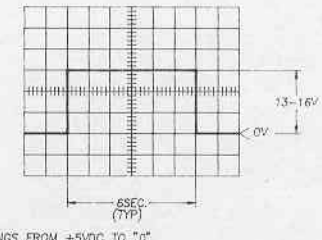
TP-24
PROBE:X1
VERT:5V
HORIZ:10MICROSEC.



TP-29
PROBE:X1
VERT:5V
HORIZ:10MICROSEC.

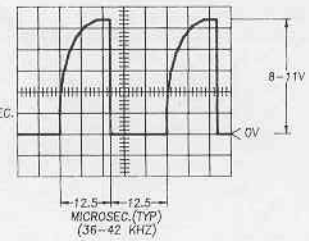


TP-31
PROBE:X1
VERT:5V
HORIZ:1SEC.

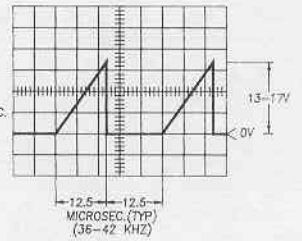


TP-32: SWINGS FROM +5VDC TO "0" DEPENDING ON SIGNAL DRIVE.

TP-22
PROBE:X1
VERT:2V
HORIZ:5MICROSEC.



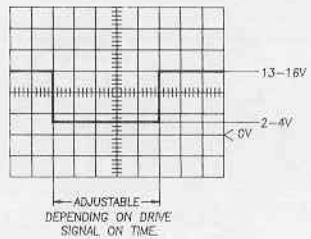
TP-25
PROBE:X1
VERT:5V
HORIZ:10MICROSEC.



TP-26:-10VDC

TP-27:+10 TO -+12VDC, or "0" DEPENDING ON OPERATION.

TP-30
PROBE:X1
VERT:5V
HORIZ:.2SEC.



700232

PROPRIETARY NOTE

FRACTIONS ± 1/64	DECIMALS .XX ± .01 .XXX ± .005	ANGLES ± 30'	MATERIAL	REMOVE ALL BURRS AND SHARP EDGES
DRAWN BY D.PALADINO 8.25.83	CHECKED BY	DATE	FINISH	
SOURCE	SIZE D	DRAWING NO. 700232	REV C	
NEXT ASSY	USED ON	SCALE .75:1	WT.	SHEET 3 OF 3

DYNARAD

SCHEMATIC DIAGRAM, TEST POINTS, PC.BD., DENTAL CONTROL

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